# ELECTRICAL REVIEW

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2nd January, 1948


## Contents


**EDITORIAL**—Electrical Safety . . 1

**ARTICLES**—
- Making Power Capacitors . . . 3
- Industrial Mexico. By F. J. Erroll, M.A., A.M.I.E.E., M.P. . . . 9
- Manufacturing Progress . . . 32

**REPORTS**—
- Electricity in Factories . . . 8
- I.M.E.A. Activities . . . . 11
- Swedish Home Electrification . . 16
- Water-Tube Boilers . . . . 17
- Lighting in Kingsway . . . . 19
- E.D.A. Economy Campaign . . 20
- Coal Production . . . . 20
- Overseas Electrical Trade . . . 25

**REPORTS**—*continued*—
- Municipal Reports . . . . 28
- Electricity and Coal Economy . . 34

**NEWS SECTIONS**—
- Personal and Social, 13 ; Commerce and Industry, 21 ; Electricity Supply, 27 ; Financial, 29 ; Contracts, 35.

**VIEWS ON THE NEWS** . . . 12

**CORRESPONDENCE** . . . . 14

**RECENT INTRODUCTIONS** . . 15

**NEW BOOKS** . . . . . 18

**NEXT WEEK'S EVENTS** . . . 34

*Classified Advertisements* . . . . 59

*Index to Advertisers* . . . . . 80



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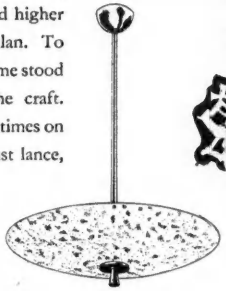

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# ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

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# Electrical Safety

## Lessons from Factory Department Report

THE issue for the first time since the beginning of the war of "Electrical Accidents" in a form that is available to the general public is welcome. Analyses of failures of human and material factors and constructive suggestions for their avoidance thus presented by the Electrical Branch of the Factory Department have been influential in keeping the number of such accidents, despite a rapid increase in the use of electricity, at a very small percentage of the total from all causes. Publication earlier than almost twelve months after the period to which it relates would, nevertheless, enhance the value of the document.

### Fewer Industrial Fatalities

A gratifying feature of the report for 1946, reviewed in this issue, is that the aggregate of fatalities owing to electricity was the lowest for the past five-year period. Under one-quarter of these were, strictly speaking, factory accidents. They were fewer than those in domestic premises, too many of which occurred in bathrooms, although the prominence given to the subject in the Press should serve as a warning against the misuse of portable heaters, which is a common danger. The large proportion of the balance which was due to live rails on electrified railways and to overhead lines indicates that precautions in these directions should be tightened.

Portable tools made a better showing than in the previous year, when they formed about two-fifths of fatal electrical accidents in factories, but negligence (such as replacing fuses without ascertaining the reason for their blowing) and poor maintenance are the main causes for the large contribution they make to the black list. Such common practices as lifting even heavy tools by means of their flexible cables call for particular attention to insulation and anchoring at the cable entry. Not many accidents, however, can be ascribed to poor design. Newcomers into industry are naturally more liable to injury, but there is evidence that for some years past the number of electrically skilled men involved has been going up, probably as a result of over-confidence leading to carelessness. This attitude is no doubt also reflected in the preponderance of fatalities at voltages of 250 and under.

Load shedding has been responsible for fewer and less serious accidents than might have been expected, and the rota system, which gives the equivalent of a warning of possible cut-off, will probably help to reduce the incidence of these. For example, care can be taken to see that any process requiring ventilation to ensure safety can be stopped immediately if the supply to the fans should be interrupted.

### Artificial Respiration

Particular attention should be paid to the details given in the Report of successful restoration of consciousness by artificial respiration. These point to the need for giving the widest instruction to factory workers in an approved method, and demonstrate that chances of survival are greatly increased if treatment is given immediately and continued in extreme cases for perhaps several hours. Further

improvements are to be expected in the present position as better materials become more readily available and more adequate methods of training and selecting maintenance staffs are evolved, with an appreciation of their value on the part of non-electrical manufacturers.

**Volumes and Values**

THE review of November overseas electrical trade on p. 25 is based on values; the Board of Trade returns are incomplete as regards quantities. It is of interest, however, to compare volumes in a few cases to see how the physical as well as the fiscal value has increased. Electrical machinery exports, for instance, amounted to 6,300 tons as compared with a 1938 monthly average of 3,700 tons, an increase of about 70 per cent. Domestic radio sets averaged 7,053 in 1938 and 28,599 in November, an increase of about 300 per cent. The number of " bulbs and discharge lamps " exported rose from 1,638,090 to 2,181,808 (33 per cent) and house service meters from 13,778 to 43,867 (nearly 220 per cent).

**Inferior Exports**

OUR recent remarks upon a complaint from New Zealand about the quality of some electrical goods sent from this country have caught the attention of the Board of Trade and the British Electrical and Allied Manufacturers' Association and we are pleased to see that active measures are being taken to put a stop to the practice. Reputable manufacturers are particularly concerned to ensure that British standards are maintained and it is to be hoped that the Association's representatives in overseas markets will keep on the alert to report any departures from these standards and nip them in the bud. It is absurd, as well as disastrous, that scarce materials should be allocated for this kind of product and this is where the Government should step in.

**B.I.F. Electrical Committee**

IN pre-war days much useful work was done at the British Industries Fair by the Electrical Exhibitors' Committee in the way of co-ordination to make the electrical section one of the most attractive at Castle Bromwich. Accordingly we note with pleasure the revival of this Committee for the 1948 Fair. The chairman is Mr. F. G. Nesbitt (Simplex Electric Co.) and the vice-chairman Mr. Raymond Berry (Berry's Electric), whose father, the late Mr. H. H. Berry, was a very active member of the Committee for some years.

**Cleaner Coal**

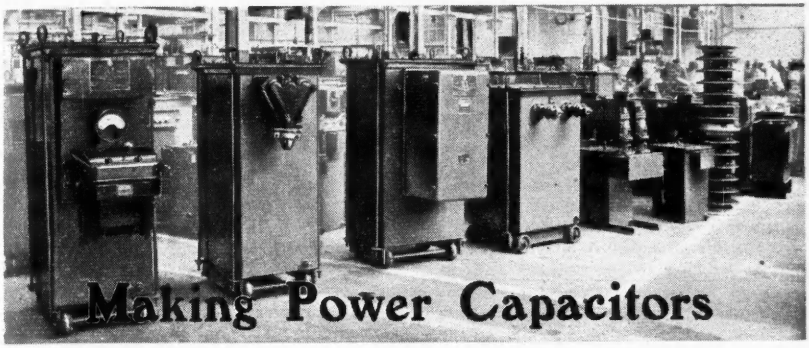
THE chairman of the National Coal Board (Lord Hyndley) has promised an improvement in the quality of coal, and last week he showed that this was already being achieved. He said, for instance, that in recent weeks the loss of generating capacity attributable to unsuitable fuel had been the lowest for a number of years—less than 200 MW as compared with as much as 380 MW during 1946. The lower figure was presumably obtained after the relatively easy conditions of the summer, when plant was overhauled. Fouling of external surfaces of boilers, for instance, is a rapidly accelerating process once it starts. A clearer idea of any improvement will be obtainable after a winter's run with all-out steaming.

**Rising Cost**

LORD HYNDLEY appears to be moderately satisfied with the way in which the coal industry is shaping and certainly if better fuel is provided the electricity supply industry will also be moderately pleased. Full satisfaction is unlikely because the improvement will have to be paid for. A further half-a-crown went on to the price of the ton of coal on New Year's Day and there is a general feeling that this is not all that will be added this year. It seems certain that electricity prices will have to go up soon and this will tend to create an unfavourable atmosphere for the new organization which, of course, will be blamed as it will also be blamed for the continued plant shortage.

**Absolute Units**

As from 1st January electrical measurements ceased to be made on the " international " system of units and are now required to conform to the " absolute " system introduced by the National Physical Laboratory and corresponding bodies abroad. As a result, some of the apparatus used in test rooms of supply undertakings will need modification in accordance with the procedure laid down by the Electricity Commissioners and outlined in last week's issue. For practical purposes the most commonly used instruments, integrating wattmeters and indicating meters, will be unaffected.



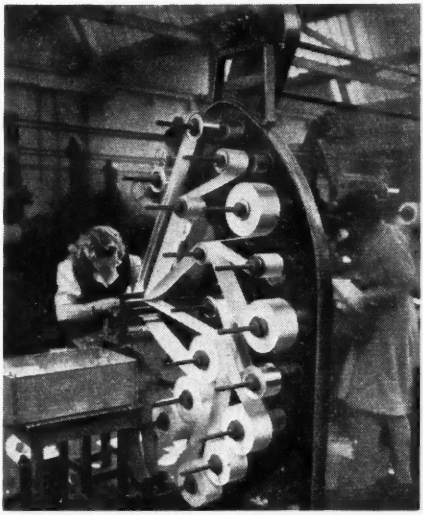
# Making Power Capacitors

## Principal Processes Outlined

As a further contribution to our series of articles designed to present to our general readers accounts of how electrical equipments they use every day are produced, we now deal with the condenser or capacitor used mainly for power-factor correction on supply systems and industrial installations. For this purpose we recently visited the Helsby works of British Insulated Callender's Cables, Ltd., where we studied the processes involved.

The factory is devoted to the production of many types of capacitors apart from those with which we are concerned at the moment. Covering the whole field, three classes of capacitors are made. They are (*a*) oil-impregnated and oil-immersed paper-dielectric capacitors (oil type); (*b*) petroleum-jelly-impregnated paper-dielectric capacitors (P.J. type); and (*c*) electrolytic capacitors. Practically all the oil-type capacitors are those with which we are concerned, i.e., power and industrial p.f. correction units and similar products for h.v. smoothing, impulse generators, carrier-current couplings, etc. But many of the smaller equipments in the p.f. correction group are of the P.J. type. The electrolytic capacitor, however, is almost entirely outside our field of immediate interest, and relates largely to radio and telephone equipment.

The principal raw materials are oil, petroleum jelly, high-quality tissue paper and aluminium or, in some cases tin foil. The tissue and foil are both received in rolls of the required widths and wound on metal or hard-paper cores of the correct diameter for accommodation on the winding machines. The widths of both the paper and the foil vary from ½ to 7 in. (1·3 to 17·8 cm). The rolls of tissue and foil are mounted on winding machines on which they are so disposed that during the winding operations the tissues and foils converge to a point where there is a power-driven mandrel on to which they are wound into one common roll in which the foils and tissues are interleaved. The number of tissues



**During winding the tissues and foils converge to a power-driven mandrel on to which they are wound in one common roll**

between the strips of foils varies from two to six, according to the working voltage.

As the winding proceeds short lengths of foil (tabs) are inserted, so that they rest longitudinally in contact with the foil, and five or six of these tabs, which are required for connection purposes, are evenly distributed throughout the length of the foil. At a midway point in the roll a turn of corrugated paper is also inserted, so as to provide ducts for the circulation of the oil when the roll or element is in service. Following the winding of the element rolls is a group of bench operations which include sawing off the surplus ends of the cores, folding over the tab ends in bunched formation, punching a hole through each bunch, threading the whole with a connecting wire, and finally soldering the connection.

### Drying and Impregnation

The elements are then placed in quadrant-shaped metal boxes which, in turn, are put into tiered cradles, with four quadrants in each of the several tiers, specially designed for handling the elements during the subsequent drying and impregnating processes. Overhead runway hoists are used for handling the cradles for loading and unloading the steam-jacketed drying and impregnation pans. For drying the whole of the moisture is drawn from the element materials and exhausted by vacuum pumps. The combined operation of drying and impregnating is of vital importance as are the correct treatment conditions of vacuum and heat at this stage.

The overall time required for both drying and impregnating varies from 24 to 72 hours, according to the size and type of the capacitor. The steel drying and impregnating pans are, of course, hermetically sealed during operations. After the initial drying period and while the elements are still in vacuum, the oil is pumped into the pans. The oil is of the highest grade and is specially processed in the works. When the cradle is lifted out of the impregnating pan the quadrant boxes are left filled with oil, i.e., the elements are still immersed, and this oil immersion is an essential feature of the production as a whole.

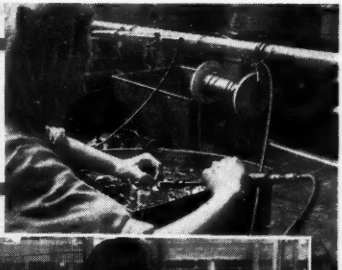
At this stage the elements are tested, first by way of flash pressure testing, and then for capacitance, p.f. loss and insulation resistance. Every element is flashed at a potential about five times the working voltage. For the capacitance test a sample is taken out of every box, and from this test is calculated the number of elements required on the frames. Both the capacitance and p.f. loss tests are carried out on a "Wiens" bridge.

After testing, the elements are assembled on their frames in partially-oil-filled trays, so that the actual assembling takes place while the elements and the frames are immersed. The frame consists of top and bottom pre-impregnated hardwood cross members with a number of element assembling spindles. In the larger sizes, where additional strength is required, stays are also included in the structure. First the frame without the top wood member is placed in the tray and the elements are slid one by one on to the spindles. During these threading operations, fuse carriers are interposed between the elements. Each fuse carrier consists of a piece of presspahn on to which a lead-alloy fuse and connecting wire are pre-assembled in the shops. Each element or each series group of elements is individually fused, so that at the same time a presspahn carrier and spacer is also placed under each element.

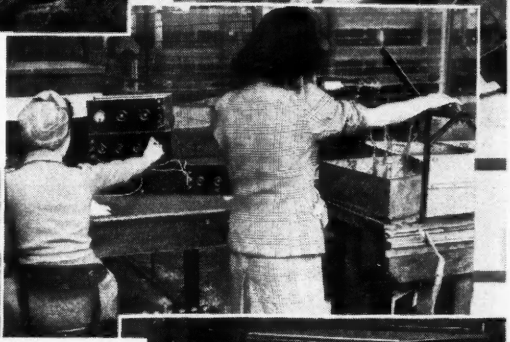
The top wood cross member is then placed in position and the whole structure is bolted up to form a rigid assembly. Various sizes of the frames are made with from 15 up to 100 elements per frame. Now the risers are applied to the frames and the individual element connections are soldered. For this purpose the general assembly is slightly raised to project out of the oil. The element assemblies are now ready for insertion in the capacitor containers. For the bulk of the production, i.e., capacitors above 8 kVA, welded-steel tanks are used, and for the smaller sizes welded or soldered tinned iron boxes are employed. The assembly of these smaller products is rather different from those already described in that the elements are built up on grid-type frames fitted into the bottoms of the boxes, with the spindles projecting upwards.

### Further Tests

For the reception of the frame assemblies in the tanks channel guides are placed inside the tank. These guides are constructed in the factory and consist of steel channel pieces spot-welded to cross members. Now the assemblies in the tanks are ready for pressure testing in a specially equipped bay, and following the pressure testing there are tests for capacitance and insulation resistance. Any breakdowns which may occur when



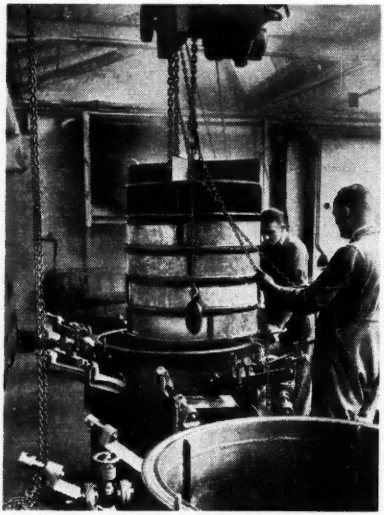
Top left: Sawing off the surplus ends of the cores. Top right: Elements leave the cradles immersed in oil in their quadrant boxes. Right: After impregnation the elements are flash tested and then tested for p.f. loss, capacitance, and insulation resistance



Left: For h.f. capacitors elements are assembled horizontally across the frame and, in turn, across the tank

Above: Testing P.J. capacitors with electronic equipment. Left: Elements are assembled on their frames in partially oil-filled trays. Right: For multi-pack capacitors many individual bench processes are required

the pressure testing is being carried out can be detected during the capacitance test as the result of the blown element fuses.

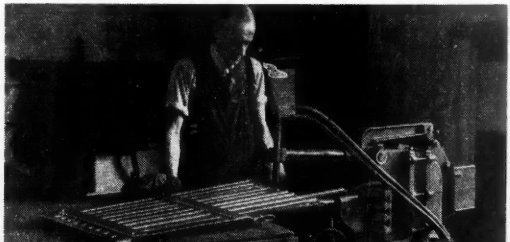


**Overhead runway hoists load and unload drying and impregnation pans with cradles filled with quadrant-shaped metal boxes containing the elements**

After these tests the wiring is completed by bringing out the main leads to the main terminals of the capacitors. For normal operation delta connections are used but star connections may be employed in special cases. For the larger sizes of capacitors chokes of high a.c. impedance, but of low resistance, are used, so as to discharge the capacitor from the nominal working voltage to a safe handling value not exceeding 50 V within 60 sec from disconnection of the supply. Further, for the larger sizes it is convenient to employ busbars at the top of the tank assemblies, to facilitate the main connection arrangements. At the time of the final wiring the various types of control and switchgear required are fitted to the tanks and wired up. These include oil circuit breakers, contactors and air-break switch-fuses.

The capacitors are then ready for final testing which, in the first place, includes pressure testing between the terminals and the tank. Then each capacitor is subjected to the working voltage while the phase currents are measured individually for balancing purposes and checking up the correct outputs. All the switches, etc., are also tested at this point. The tanks are topped with oil and samples of the oil are taken from the larger tanks and pressure tested. Finally, the tank lids are put on, and after painting, etc., the capacitors are ready for dispatch.

The foregoing applies wholly only to capacitors for normal supply frequencies. Nowadays, however, there is an increasing demand for capacitors for use on high-frequency supplies, particularly in connection with heating developments. Capacitors are made for up to 2,000/3,000 c/s for h.f. induction furnaces for melting metals, and up to 10,000 c/s for the induction heating of metals for heat treatment and various flow-line processes for small parts. An essential difference in the make-up of the elements of these capacitors is that the paper and the foil of the elements are not of the same width. The foil projects from the paper on either side, and thus affords adequate conductivity for the heavier currents. It also provides for better cooling. Impregnation follows in a similar manner to that already described, and the general processes are also very similar to those which are employed for the normal industrial 50-cycle capacitors.



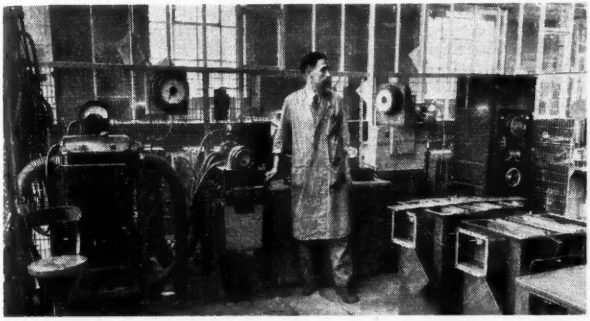
**Tank guides for the assembly frames consist of steel channel pieces spot-welded to cross members**

In all h.f. capacitors the elements are threaded on insulated spindles, because of the higher voltages to which they may be subjected. It is essential that the adjacent ends of these h.f. elements, where the foil is exposed, shall be of similar potential, and the elements of a series group are therefore arranged all on one spindle. Further, in the tank the assembly is horizontal instead of vertical and this facilitates the wiring by virtue of the common risers at the ends of the elements. Again, it is usual in the h.f. equipments to employ wooden frame guides in the tanks, so as to avoid earthing of the horizontal spindles. Some of the highest frequency capacitors are built in tinned steel boxes to reduce space. In these the leads are brought through non-ferrous lids, reducing eddy currents to a minimum. Copper bars are also used for the highest frequencies because of the heavier currents.

Where porcelain housings are required, such as in line-to-earth capacitors used in conjunction with carrier-current systems and supervisory protective systems, the clamp construction is employed. This involves a number of oil-immersed paper-dielectric flat elements, built up with separators between the elements, the whole being clamped together. Some of these assemblies have to withstand a 300-kV r.m.s. test.

As already indicated, the P.J. type of construction is used for the smaller capacitors, mainly on the score of convenience and economy in manufacture. The elements are usually flattened to facilitate packing in the lighter construction of tinned-iron boxes. In principle the general processes are similar to those in the case of oil-filled capacitors, but there are many modifications to suit the manufacturing programme for a smaller product. Perhaps the greatest difference relates to the winding of the elements on collapsible mandrels, so that when the element is removed from the mandrel it is pressed flat simply by the operative's fingers.

After the winding and flattening of the elements a whole series of winding and assembly operations, all of which are, in principle, similar to the appropriate processes employed for the larger equipments, are conducted in flow-line fashion alongside a conveyor belt which passes the assembly progressively from one process to the next. For multi-pack capacitors, such as those employed for single-phase capacitance motors, there are many individual bench processes, all contributing to the build-up of the final assembly.



**Final proving includes pressure testing between the terminals and the tank**

After the packing in the containers and the completion of the wiring and the connecting work the equipments are subjected to predrying, vacuum drying and impregnation. All the operations in this series are similar to those employed for the larger products, modified to suit the smaller capacitors.

Pressure, capacitance and insulation-resistance testing follow, and in this connection an electronic general-purpose testing equipment designed and produced by the company is put to good use. A capacitor is clipped in circuit once only for all the tests, and a hood, which covers the work under test, is interlocked with the supply circuit as a safety measure. This general-purpose equipment is used to apply pressure across the capacitor terminals and between the terminals and the case, and to measure the ohmic resistance of the discharge resistance and the actual capacitance. After testing, the lids and terminals are fitted and various finishing processes are applied. Here again the conveyor belt is employed for passing the products from one stage to the next.

We are indebted to British Insulated Callender's Cables, Helsby, for their help in collecting the above information and in taking photographs.

# Electricity in Factories

## Causes of Accidents in 1946

PUBLICATION of " Electrical Accidents and Their Causes " has been renewed in pre-war form. The new issue, covering 1946, is obtainable from H.M. Stationery Office (Form 929, Ministry of Labour and National Service) at 9d. net. In it the Senior Electrical Inspector, Mr. H. W. Swann, refers to 769 accidents reportable as entailing more than three days' disablement, of which 33 were fatal. There were 62 non-reportable accidents notified, 16 of them fatal. In addition 98 fatalities on non-factory premises, including 37 on domestic premises (9 in bathrooms), were unofficially reported, bringing the total electrical fatalities to 147, as against 178 in 1945.

Skilled personnel were involved in 285 of the reportable accidents (15 fatal). While the greatest number of injuries (161) was caused by eye-flash in welding, none of these proved fatal, but in the next highest category, portable tools and flexible cables were responsible for 157 accidents (8 fatal) compared with 207 (13 fatal) in 1945. Two-thirds of the 33 fatalities happened at less than 250 V; in one death at radio frequency the voltage was doubtful, and in one relating to d.c. the voltage was 2,500. Dangerous occurrences (reported under S.R. & O. No. 31, 1st February, 1947) numbered 46 compared with 66 in 1945.

### Results of Artificial Respiration

As a result of electric shock there were 49 cases of complete unconsciousness. Three victims died out of five in which artificial respiration was not attempted. In the remaining cases it was applied and succeeded in 24. In 9 unsuccessful efforts, delay in starting was 2 minutes or more, whereas there was no delay in 21 of the 24 successful instances.

An analysis is given of 38 failures of switchgear, transformers and other apparatus with explosive violence or causing fire with or without personal injury. Load shedding has been responsible for few accidents, but these emphasize the need for all electrically operated safety devices to " fail for safety." Accidents resulting from the absence of a permit-to-work scheme or its improper use and from mistakes of various kinds are described.

Protective gear is sometimes ineffective on account of high fault-circuit impedance, and periodic tests with records are advocated. There is a need for commercial instruments that are capable of measuring the impedance, which has to be related to the protective gear setting. Owing to the use of non-metallic water mains in some cases, a good earth cannot be assumed without testing at intervals by qualified persons, and reference is made to E.R.A. Report V/T. 101.

Fuses devised to meet the starting conditions in the textile industry are being tried. In some cases groups of three-phase, 6,000-r.p.m., 80-W, 80-V, 100-cycle motors are connected to common fuses in order to minimize the amount of copper in control gear exposed to the corrosive atmosphere. This gives practically no protection for individual machines and results in high maintenance costs. Transforming to 110 V for portable tools, especially if the mid-point is earthed, is recommended; this applies particularly to building operations.

Shock risks at radio frequencies are not so great as at normal supply frequency, but burns are sometimes difficult to heal. There is, so far, no evidence that workers have suffered through exposure to stray fields.

A list of sixty certificates issued by the Chief Inspector of Factories for electrical apparatus to be used in specified atmospheres is given as an appendix.

## French Lamp Production

### From Our Paris Correspondent

THERE is still a shortage of electric lamps in France, although production has been fairly steady. During the first half of 1947, total output was 36 million, but during the third quarter production fell, owing to the strikes and period of paid holidays. Production for the fourth quarter was estimated at 18 million, but once more strikes will have affected output. Altogether, for 1947, production was envisaged at between 55 and 56 million. Out of this total 35 to 40 per cent are absorbed by the public services such as the railways, mines and Electricité de France. About 60 per cent are sold to non-priority consumers.

Present level of French production is about the same as that for 1938. Manufacturing difficulties have slowed down production, however. In the Montieramey plant, automatic machinery is now being used and production should reach 40,000 to 50,000 a day. The Ivry Lamp Company could also increase its production if it could obtain licences for importing an automatic machine it has ordered from America. If licences are not forthcoming there is a risk that this machine will be purchased by the Italian industry.

An agreement has been signed with Belgium for the import of lamps to the value of 10 million Belgian francs, and since the beginning of the year 3 million lamps have been received from Czechoslovakia and 5 million from America. The present-day quality of French lamps is lower than before the war. Lack of proper packing also results in serious loss.

# Industrial Mexico

## Prospects for British Exporters

**By F. J. Erroll,**
*M.A., A.M.I.E.E., M.P.*

***In the course of a recent visit the author investigated possible openings for British trade and in this article he reviews industrial conditions in Mexico and makes a number of suggestions***

GREAT Britain and Mexico are geographically half a world apart, and in temperament, racial progression, and characteristics have very little in common. But in other respects the two nations have a considerable historical background that has drawn them together in mutual interest and sympathy. In the late nineteenth century, when industrial Mexico was young, although her civilization already had a history far older than our own, British interests played an important part in fostering and developing Mexican industries. Later, British manufactures found a ready, though somewhat limited, market in Mexico, and during the two world wars Mexico's abundant oil and metallic mineral resources were an important item in the Allied war effort.

Thus it is that we can view with very real understanding the problems of the economic crisis through which Mexico is now passing. And our understanding is lent force by the fact that many of the factors in that crisis are now in varying degrees identical with our economic problems. In common with Britain, Mexico must import to live. Before the second world war, 75 per cent of her total imports of food, raw materials and consumer goods came from the United States. During the war these imports were necessarily reduced, but after the war were again restored to a high level—in 1945 they represented 82·4 per cent of the total, and in 1946 were 75·6 per cent. Moreover, Mexico's large reserves of American dollars, built up during the war years, have now dwindled, and, indeed, Mexico has already received a loan from the Export-Import Bank of $50 million. Mexico, then, is short of dollars, and her adverse balance of trade is worsening. The nation's economic recovery is further hampered by a shortage of raw materials and of skilled labour (out of a total population of 22 million only about 600,000 are in industry) and of industrial machinery and equipment which is now war-tired and difficult to replace.

These are the broad problems which face President Aleman and his Government in their struggle to rehabilitate Mexico's national economy. This task is even more complicated by an inheritance of eruptive progressions and retardations in the development of Mexican industry since the "Industrial Revolution" at the end of the eighteenth century. Earlier than 1880, several attempts had been made by foreign interests, notably British, to modernize the Mexican mines. Mineral ores, principally silver, gold, copper and lead are the country's richest natural resources, but for centuries they had been extracted by primitive methods, and manhandled from minehead to the disposal centres. Under the régime of General Porfirio Diaz (1877-1911) Mexico experienced some degree of political stability, which was reflected in active industrial and economic planning. Technical and financial assistance was quickly forthcoming from abroad, and the mines were mechanized, labour trained and railways constructed. Coal mining was started in 1884, petroleum production began in 1901, and ten years later had given Mexico third place among the oil-producing nations. Cotton and woollen mills, iron and steel works, jute factories, and other manufacturing industries were established, and prospered.

In 1910, however, yet another period of revolutionary disturbances began, and although the demands of the first world war kept the oil and copper industries fully occupied, Mexican industry generally declined until about 1920. Then began another wave of foreign investment, and during a period of about ten years American and British interests assisted in reconditioning and expanding the mining plants, building new railways and a telephone network, and bettering other communication facilities. After sharing in the world-wide economic depression of 1931 and 1932, Mexico in 1933 entered a notable period of economic advance which lasted for about four years.

During the latter part of the Cardenas administration (1934-1940) the expropriation of the oil plants, railways, and other concerns in which foreign capital had been invested—mostly British, American, and Dutch—caused

a severe setback to the industrial development of Mexico. But, following the inauguration of General Camacha in 1940 there was a vigorous reorganization and expansion of Mexican industry. Manufacturers were aided by better transport facilities, the growth of the electric power network, and a more skilled labour force than had previously been available.

**Electric Power Development**

The power network is a particularly important aspect in assessing Mexican industrial development. Mexico is rich in water power resources, and water power has been the mainstay of manufacturers. Hydro-electric power was first developed in 1893 by a British company. Since then the harnessing of water power resources—including the founding of the Mexican Light and Power Company, and the construction of the great Necaxa hydro-electric plant—has been undertaken with considerable financial and technical help from British interests.

Although progress was at first rapid, in recent years power developments in Mexico have failed to keep pace with the ever-growing demands of industry. But in 1943 the National Electrical Commission embarked on a ten-year programme for expanding the power resources, involving an increase in capacity of 500,000 kW. In 1939 the electrical plant was rated at 680,158 kW, of which 531,748 kW was in public utility systems (the most important of which is the Compania Mexicana de Luz y Fuerza Motriz, S.A.) and 148,410 kW was private plant. About 68 per cent of the public utility power is from hydro-electric resources, while steam generators produce 70 per cent of the total power from privately-owned plants.

Increased supplies of power will be wanted for the comprehensive programme of public works now being embarked upon, and for the many new factories that are being built. The majority of these are the Mexican subsidiary plants of American and Canadian companies, but some are entirely Mexican owned and operated.

This widening of industrial activity has been stimulated by the present Mexican Government. The principal ministers are big industrialists or financiers who are seeking Mexico's commercial prosperity. The Secretary of National Economy is Antonio Ruiz Galindo, a far-sighted statesman and business man, who is the leading figure behind Mexico's economic recuperation campaign.

To assist in the rehabilitation of industry the Mexican Cabinet in May, 1947, through the Bank of Mexico, restricted bank credits for the import trade, and diverted them as far as was possible to productive uses in industry and agriculture. These measures were followed two months later by direct restrictions on import trade, and the situation is still that only essential goods can be imported. Perhaps this is the principal reason why British exporters have been so diffident about breaking into the Mexican market. If it is, then they should revise their views. There is no restriction on foreign exchange; Mexico can pay for imported goods in a currency that is one of the strongest in the world; moreover, although there are temporary restrictions on luxury and unessential commodities, there is an eager demand for capital goods—and in this field there are attractive opportunities for British manufacturers of electrical machinery and equipment.

**Advice to British Exporters**

During a visit I paid to Mexico this year I had the opportunity of exploring the possibilities of the country to British exporters. "Anyone who knew Mexico only before the war is not in a position to advise on Mexican prospects now," was how an Englishman in Mexico described the evolution that has taken place over the past few years, and in assessing the value of Mexico as an export market one must have up-to-date information. It is useless to send a salesman with samples or brochures. A personal visit from a director or high executive is a first essential —preferably a man who can speak Spanish fluently. British manufacturers will not easily obtain a footing in the Mexican market. American firms are already there, and have dug themselves in deeply. The Americans have gone into the market aggressively, whereas the British have been altogether too timid.

Mexico has, in fact, forgotten that we export at all. British firms have been out of the market for the last eight years, and the name of a British firm means little in Mexico now, unless it has been constantly before the buyers during the war years. When a British firm decides to enter the Mexican trade it must at the same time be prepared to spend money doing so. It will almost certainly be faced with some hard American selling methods. If the firm manufactures capital goods it will be advisable to investigate the market closely by visiting likely users and discussing their technical and other problems.

It might be desirable to link up with another firm making a complementary range of equipment in order to secure a volume of sales sufficient to maintain a joint office in Mexico. If an agent is appointed he must be the right man, and he will be difficult to find.

There are many types of sales organizations to be seen in Mexico, instituted by different American firms, and the merits of each should be taken into consideration, and where necessary applied to British selling methods. Several American firms selling the same product have grouped together and opened a joint office and showroom in Mexico City. For example, electric welding sets, manufactured by several different American firms, are displayed and sold in one office and showroom. And American producers of electric motors, I was told, have combined to set up a Mexican " motor centre." Another group of firms has opened a common showroom which displays a complete domestic electrical installation. One firm supplies cables, another switchgear, and a third household appliances. One visit from a buyer and the whole installation can be supplied. The volume of trade might not have been sufficient for any one of these firms to have maintained its own establishment, but jointly the venture is a success.

Yet another example of enterprise is in the local manufacture or assembly of American goods. Heavy equipment is especially suited to this procedure, for it can be imported partially assembled and finished locally. This method is encouraged by the Mexican Government, and will in all probability secure a preferential tariff rate. British manufacturers need have no fears about the quality of Mexican labour. The skilled workers are efficient and easily trained. There is a severe shortage of skilled workers, but their numbers are increasing rapidly. It is in this sales method of local assembly that British exporters can best make up for the leeway, lost to the Americans, by jumping the intermediate stage of an office and showroom only in Mexico.

Finally a note on starting in business in Mexico. Many of Mexico's most important laws are available in English (from the American Chamber of Commerce in Mexico), and these provide a necessary introduction to commercial activities. Britain has an able Commercial Secretary; in comparison the U.S. Embassy has a very large commercial section. Generous tax remission is given to new business concerns, especially those connected with mining. Personal income tax is very light, and exists at all only at the higher levels. To tempt one even more: there is no rationing, abundant living accommodation, and very little form-filling.

# I.M.E.A. Activities

## Preliminary Convention Programme

THE preliminary programme of the Eastbourne convention (7-11th June) issued by the Incorporated Municipal Electrical Association shows that traditional lines will be departed from to some extent. Upon the assumption that the Association's affairs will have been wound up by next June, no annual meeting is arranged.

There will be the usual reception by the president (Mr. J. Eccles) on the evening of the first day and on the following day the customary official opening and presidential address. The exhibition will be formally opened and there will be a ladies' tea with a reception by the Mayor of Eastbourne in the evening.

Wednesday, 9th June, will be devoted to full- and half-day trips to various places of interest. On the Thursday the morning session will be followed by the usual E.A.W. luncheon, with the annual dinner and dance in the evening. No reference to the reading of papers is made in the preliminary programme, but we understand that arrangements are being made for the presentation of some.

**Voltage Standardization.**—The Electricity Commissioners have been approached by a number of electricity supply authorities regarding the difficulties in the way of conforming with the standard 240 V in connection with new supplies. In one case an undertaker has asked to be allowed to continue 230-V supplies in the case of isolated transformers on existing h.v. mains to avoid having consumers in the same locality on different voltages and subsequent difficulties. Another has asked for a general consent to change from 230 to 240 V with the intention of declaring 240 V to all new consumers. The Electricity Supply Joint Committee has appointed a deputation to discuss the matter with the Commissioners.

**Cable Supplies.**—Representatives of the I.M.E.A. recently discussed with representatives of the Cable Makers' Association the position with regard to the supply of cable materials. It was stated that the cable makers were being urged by the Board of Trade to increase the proportion of their products sent overseas at the expense of home consumers.

# Views on the News

## Reflections on Current Topics

NO better choice of a place for the historic first meeting of the London Area Electricity Board could have been made than Falcon House, Aldersgate. Apart from the fact that Mr. H. J. Randall is managing director of the City of London Electric Lighting Co., Ltd., which occupies the premises, it can truly be claimed that the building is in the heart of London. From its windows can be seen most of the northern portion of the City of London, the clearing of which after its devastation from bombing makes it possible to trace almost the whole course of the ancient wall with its bastions. The actual conference room in which the meeting took place is also not without interest. It is apparently oak-panelled throughout and it is only by tapping it that one discovers that this is cunningly camouflaged asbestos sheeting. This must surely be one of the last rooms to be heated by those "sausage" type radiators that were in vogue a generation ago, combining light with heat.

* * *

I still think that the choice of the title "British Electricity Authority" for the new organization was unfortunate. Constantly I see the B.E.A. reported as having done something or other only to find that the British European Airways is responsible. It is particularly to be hoped that a heading in *The Times* one day last week was not prophetic: "B.E.A. Loss Over £2M: A Difficult Year."

* * *

Isn't it nearly time people were educated out of the habit, adopted in the early days of domestic electrification, of talking about "electric light" when they really mean all the varied domestic uses of electricity? In announcing increases in the London and Home Counties Joint Electricity Authority's domestic two-part tariff the *Evening News* has the heading "Light May Go Up." Apart from being ambiguous it is unlikely that lighting accounts for more than about one-tenth of the average consumption under the two-part tariff and if electric heating or water heating is employed to any extent the figure may be very considerably less. For that matter, unless electricity is used for cooking, heating or water heating consumers do not normally choose to be charged under the two-part tariff; if it is only lighting they require it is cheaper to be on the flat rate.

* * *

Our ever-cautious Minister of Fuel and Power declined to permit shop-window lighting at Christmas, probably because of the moral effect of an apparent waste of electricity. I think that he might have relaxed the rules for a day or two and perhaps he will feel able to do so next Christmas. In Eire there has not been a complete ban on shop-lighting and such minor restrictions as existed have now been removed. That is, shop windows may be lighted during daylight hours and at night when the shops are closed for business. I still believe that light is a tonic and commend that view to the Minister, although I would not yet suggest after-hours shop-lighting.

* * *

Greater production and the search for new markets abroad make a bigger demand than ever before for well-trained workers in all ranks from craftsmen to managers and research workers. That furnishes the most immediate reason advanced by the Working Party of the Ministry of Education for recommending the establishment of a National Advisory Council on education for industry and commerce which has just been published by the Stationery Office at 2d. Such a Council, if it is set up, will find the considered lines of advance for the electrical industry already laid down in the reports drawn up and debated by the Institution of Electrical Engineers during the past few years.

* * *

In his recent book on the atom Professor Andrade touches upon frequencies and wavelengths and refers to the visible spectrum, the regions just above and below it, radio, etc. He mentions that the ordinary electricity supply has a greater wavelength than these and it certainly has—6,000 kilometres for a 50-cycle supply. I wonder how many of us appreciate this? The "picture" of an alternating current seen on a cathode-ray tube is rather apt to make us overlook the transatlantic span of a single cycle.

—REFLECTOR.

# PERSONAL and SOCIAL

## News of Men and Women of the Industry

THE British Electricity Authority is asking for applications from qualified legal persons for a limited number of appointments in its legal department. These include assistant legal advisers (£1,500-£2,000), senior legal assistants (£1,100-£1,400) and legal assistants (£850-£1,000 and £550-£750).

**Mr. H. L. Rochat,** resident representative in India of the Midland Electric Manufacturing Co., Ltd., with whom he has been associated for nearly forty years, retired from that position on 31st December. **Mr. C. R. Mitchard,** who has been acting as Mr. Rochat's assistant, becomes the company's resident representative for India, Pakistan and Ceylon as from 1st January. His address is P.O. Box No. 1, Kotagiri, Nilgiris, S.I.

**Mr. F. Gale** has retired from the board of Edison Swan Cables, Ltd. Mr. Gale was for many years general works manager at Lydbrook.

The Institute of Metals has elected Dr. C. H. Desch and Lt. Col. Sir John Henry Maitland Greenly fellows. Professor P. A. J. Chevenard, Professor Sir G. I. Taylor and Dr. J. F. Thompson have been made honorary members.

**Mr. Andrew Reid,** who was responsible for the press arrangements for this year's "Radiolympia," has been appointed press officer to the Radio Industry Council.

**Mr. George Green,** assistant G.P.O. telephone manager at Liverpool, has been appointed to succeed Mr. Frank Hopps, telephone manager of Newcastle-on-Tyne, who has retired after forty-one years with the telephone service.

**Mr. V. T. T. Atkinson** has been appointed assistant secretary of the Lancashire Electric Power Co.

**Mr. F. Clegg,** senior mains assistant at Hammersmith, has been appointed mains superintendant to Fleetwood Corporation at a salary of £640 a year, rising to £667.

**Mr. F. V. M. Duncan,** lighting engineer of Margate and Broadstairs Electricity Board, has been elected chairman of the Kent Section of the Electrical Power Engineers' Association.

The directors and staff of the British Central Electrical Co., Ltd., held their first annual dinner at the Eccleston Hotel, London, after seeing a very enjoyable show at the Victoria Palace. The chairman, Mrs. F. J. Conradi, said she hoped this would be the first of many such functions. Mr. Gale expressed the appreciation and thanks of the staff to Mr. Gordon Conradi.

The Merthyr Electric Traction & Lighting Co., Ltd., held a dinner for the staff and employees at the New Drill Hall, Merthyr, on 4th December. Over seventy were present, including Mr. F. J. Cursons, secretary to the company. **Mr. G. Clark,** the manager and engineer, took the chair and a toast by Mr. A. B. Cousins to the guests was responded to by Mr. Goldsworthy, after which Mr. A. J. Marshall spoke. Mr. R. Lewis, one of the oldest employees, proposed the toast to the company, which was responded to by Mr. F. J. Cursons.

Belling & Lee, Ltd., celebrated their 25th anniversary with a dinner and entertainment in London on 22nd December. **Mr. E. M. Lee,** who presided, explained that although limited in numbers by the catering regulations, in their invitations they had endeavoured to gather together those who, in particular, had been their friends and supporters during their first 25 years. **Sir Robert Watson-Watt,** who responded for the guests, remarked that those present appeared to be not only friends of Belling & Lee, but also friends of one another who had grown up in radio together. The staff of Belling & Lee, Ltd., had already celebrated their jubilee the previous week when a presentation was made to Mr. Lee of a vellum book containing the signatures of all the staff. To this book were now added the signatures of the guests present on this occasion.

As austerity regulations prevented Scottish Cables, Ltd., from holding its second annual dinner-dance, a buffet-dance was arranged and held in the Marlborough, Glasgow, on 18th December. Over 130 members of the staff and their guests were received by **Mr. Wm. Fraser,** chairman and managing director, and by his sister, Miss M. M. Fraser. Amongst those present were Mr. Wm. Fraser, junr., assistant managing director, Mr. J. S. Hastie, director and technical manager, Mr. J. Ritchie, secretary, and Mr. D. G. Sutherland, sales manager. During an interval Mr. Fraser made a brief speech in which he welcomed the members of the staff and their friends and particularly those who had recently returned from the Services. He also made reference to the important part the company was playing in the export drive.

The London office staff of Crompton Parkinson, Ltd., and their friends, more than 300 in all, gathered for the Christmas party of the Crompark Social Club at the Park Lane Hotel, Piccadilly, W.1, on 19th December. Present as guests of the Club were Mr. J. Harwood Fryer, joint managing director of the company, and Mrs. Fryer, Mr. C. F. Dickson, sales director, and Mrs. Dickson, and Mrs. E. C. Holroyde. Mr. E. C. Holroyde, vice-chairman, was prevented from attending through indisposition. The evening's entertainment included dancing, a cabaret, and competitions with a large number of prizes. Those

for the ladies were provided by Mrs. E. C. Holroyde. Mrs. J. Harwood Fryer presented the prizes to the successful competitors.

A dance was held recently by the Exeter Branch of the Electrical Contractors' Association at the Cullompton Hotel. It was organized by Mr. H. Bicker and Mr. G. Pincott, and the proceeds, over £50, were given to the newly-formed branch of the E.I.B.A.

## Obituary

**Mr. P. D. Tuckett.**—The death is reported, at the age of seventy-nine, of Mr. Philip Bedell Tuckett, who for many years was prominent in electricity supply companies. Up to 1943 he was chairman of the City of London Electric Lighting Co. and was still on the board of the company. He was also a director of the British Electric Traction Co. and other companies.

**Mr. E. B. Pausey,** superintendent at the Wallasey generating station since 1922, died on 21st December. He would have reached compulsory retiring age next July, but through ill-health had arranged to retire on 31st December. Before going to Wallasey, Mr. Pausey was at Loughborough, Bury and Hastings.

**Mr. J. F. Key.**—The death is reported in the *Electrical Engineer & Merchandiser* (Melbourne) of Mr. John Frederick Key, who went to Australia from England in 1911 in connection with a project, subsequently postponed, to electrify the Victorian railways. Later he became chief electrical and mechanical engineer of the Melbourne and Metropolitan Board of Works.

**Wills.**—**Mr. W. Allan,** late superintending engineer, North Midland District, G.P.O. Telephones, left £1,534 (net personalty £1,491).

**Mr. A. P. Trotter,** M.Inst.C.E., M.I.E.E., formerly a partner in Handcock, Dykes & Trotter, consulting engineers, and at one time Electrical Adviser to the Board of Trade, left £9,785 (net personalty £9,720).

**Mr. F. H. Webb,** manager of the Newcastle branch of Siemens Electric Lamps & Supplies, Ltd., left £3,275 (net personalty £2,998).

**Mr. W. Rennie,** M.I.E.E., sales manager and director of Watson & Sons (Electro-Medical), Ltd., left £4,602 (net personalty £4,531).

**Mr. W. Gardner,** for nearly twenty years chairman of the Morecambe Electricity Committee, left £27,298 (net personalty £26,965).

**Mr. T. G. H. Mann,** electrical engineer, Storrington, left £2,053 (net personalty £2,006).

**Mr. G. F. B. Crosland,** head of Crosland & Bateson, Ltd., electrical engineers, Batley, left £5,304 (net personalty £2,334).

**Mr. A. Edmonds,** electrical engineer, Sevenoaks, left £1,215 (net personalty £969).

**Mr. D. C. McLennan,** a former manager of the Birmingham branch of Johnson & Phillips, Ltd., left £1,812 (net personalty £1,665).

**Mr. F. S. Hayburn,** late joint managing director of the Marconi International Marine Communication Co., Ltd., left £5,588 (net personalty £1,832).

**Mr. A. D. Mackinnon,** of the B.T.H. Industrial Motor Sales Department, left personal estate in England and Scotland valued at £2,282.

# CORRESPONDENCE

*Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.*

### Dangerous Installations

SEVERAL fatal electrical accidents have recently been reported in the technical and lay Press and one wonders if anything will ever be done to prevent such occurrences. " Reflector " draws attention to flexible wires being wrapped round protuberances outside a building during construction and very rightly indicates that such practice is criminal. Quite so; but it is strange that no action seems to be taken in such cases until it is too late.

A great number of installations and appliances in use are unsafe and so long as inexperienced people are allowed to dabble with electricity, make unsatisfactory extensions, etc., further calamities are not unlikely. If a person administers poison, then obviously he would be regarded as a murderer and would be treated accordingly; but if the same person carried out an electrical extension which killed someone, that would be merely regarded as accidental death. Surely a strange situation and nothing much is being done to rectify it.

*Glasgow, E.2.* ALEX MILNE, SEN.

### Early Days at Barking

I WOULD like to thank Mr. Bridge for his letter regarding his visit to the first Barking power station. Mr. Hoadley and my other predecessors have already furnished me with much useful information.

I believe that Mr. Bridge's article should be of particular interest to me, and I am endeavouring to obtain a copy.

*Barking.* A. E. MARCHANT.
*Borough Electrical Engineer.*

# RECENT INTRODUCTIONS

## Notes on New Electrical and Allied Products

### Zinc Alloy Conduit Boxes

THROUGH-WAY conduit boxes being offered by ELECTRO DEVELOPMENTS, LTD., 15, Yeoman Street, Leicester, are being produced by pressure casting a zinc alloy named " Mazak " which, though slightly more expensive, is claimed to be of superior tensile strength to ordinary cast and malleable metal. A remarkably clean " as cast " finish is obtained.

The lid, which is secured by two brass screws, is spigoted so that the insertion of a small gasket will make the box proof against both water and gas. The entry threads are tapered to make tight joints for the same purpose. A complete range of boxes is being made for the usual sizes of conduit.

### Electric Kettle

A household kettle, polished copper or chromium plated, is now being put into full production for export by the REVO ELECTRIC CO., LTD., Tipton, Staffs. This " Revomatic " kettle is of 3·5 pints capacity, the body being domed to prevent spilling when pouring while the handle slopes backward to avoid wrist strain when pouring and risk of steam scalding the fingers when re-filling the hot kettle. The shaped 1,500-W element is of Revo manufacture; the nichrome resistor is embedded in refractory material within a shaped copper tube, which can be replaced without the use of tools. The cut-out is of the bi-metal type for ejecting the connector.

### Toaster Elements

One of the few makers able to offer replacement elements for toasters is the BRETON ENGINEERING CO., LTD., Thorburn Street, Manchester, 13. They will fit most " sliding element " models, being available in three voltage ranges and of 650 W rating. The flat nickel-chrome ribbon is wound on three strips of mica, which are press-fitted horizontally into a metal frame.

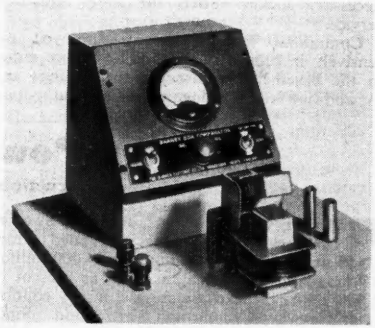
### Process Timer

A repetitive process timer actuated by a thyratron valve is announced by ELECTRO METHODS, LTD., 220, The Vale, London, N.W.11. Its range extends from 0·25 to 60 seconds, being smoothly adjustable by a single knob moving over a graduated dial, which controls a precision-wound potentiometer. The accuracy is claimed to be better than 5 per cent throughout the stated range, irrespective of changes in mains frequency or ± 15 V variations. Maintained depression of the " start " button does not render the loading relay inoperative and a separate toggle switch is provided for continuously energizing the load. Terminals are fitted for connecting extra switching positions if desired.

Model TDX.2 will control a.c. loads of up to 500 W at 250 V while add-on units are obtainable for extending the loading. By coupling two units continuously recycling sequence operation is obtainable with the duration of the timing periods adjustable independently of each other. The cabinet size is 5 by 5 by 5 in. (12·70 cm.).

### Coil Tester

A comparator for checking the number of turns of insulated wire contained in air-cored coils used for small motors and similar devices is being offered by the BANNER ELECTRIC CO. LTD., Burford House, Hoddesdon, Herts. The coils to be tested are slipped, one at a time, on to a



**Small coil comparator**

laminated core and the coil end-leads connected to the terminals provided. Comparison is made with a " standard " coil of known correctness, so that for every turn more or less on the sample being tested the instrument pointer will move plus or minus ten divisions on the meter scale. A sensitivity switch permits adjustment of full-scale deflection to guard against large errors in number of turns, so protecting the meter against accidental damage in the event of coils being wrongly connected. The instrument is a.c. mains energized and the base board can be adapted to requirements.

### Book-rest and Reading Lamp

A book-rest combined with a hooded reading lamp of low wattage, which is equally suitable for use in an armchair or hospital bed, is offered by CONSOLIDATED RESEARCH AND DEVELOPMENT. LTD., 18, Cardiff Road, Luton, Beds. This " Novelite " set is available in coloured finishes.

# Swedish Home Electrification

### Comparison with Conditions in Britain

IMPRESSIONS of electrical housecraft in Sweden were given recently at the Electrical Association for Women's headquarters by Mrs. E. A. Windsor, the second holder of the Caroline Haslett Travelling Scholarship, who has just returned from three months in that country. Mrs. Windsor thought that the standards of homes in Sweden were higher than in this country. Kitchens were better planned and more labour-saving. Electric cooking was being installed in 75 per cent of new houses as standard equipment. It was difficult to let flats that were not equipped with refrigerators, central heating and constant hot water.

Lighting was employed to a very much greater extent than here for decorative purposes and it was considered that with building costs so high it was foolish to economize on the comparatively insignificant cost of providing the necessary socket outlets for a full electrical service.

Communal laundries were employed extensively in blocks of flats. These were either in the basement or in separate buildings and in addition to washing machines and rotary ironers, cold marble mangles for pressing starched articles were employed. A third type of communal laundry offered tenants of flats the service of washing, drying and ironing 2 lb of clothes for 1s. 6d. An interesting piece of apparatus found in large kitchens was a stainless steel electrode steamer.

Electricity was rationed in Sweden to 70 per cent of the previous year's consumption and any supply above the rationed amount was charged for at 1s. per kWh instead of 1d. This was making it very difficult for factories to operate economically. Deep freezing was now being employed extensively for preserving cakes as well as fruit and vegetables. As electricity is not used to any extent for space heating and water heating but mainly only for lighting, cooking and refrigeration, the average consumption of electricity per head of the population is not so high as it is in this country and the cost is higher (average 1d. as compared with ¾d).

Mrs. M. B. Jackson, the first chairman of the Trust Committee, who presided, announced that the third scholarship would be held in Canada.

# Water Power in Sweden

### Construction of New Stations

BETWEEN 1913 and 1947, output of Swedish hydro-electric stations expanded from 1,450 million kWh per annum to 14,000 million kWh, giving an annual average at present of 2,090 kWh per head, the highest in any country after Norway, Canada and Switzerland. Since 1939 the yearly output has increased by 5,000 million kWh. About one-third of the total employable water-power is said to have been harnessed.

During recent weeks a new 46,000-kW station containing two turbo-alternators has been inaugurated by the Swedish Hydro-Electric Board at the Nam Rapids (Namforsen) on the Angerman River, 320 miles (515 km) north of Stockholm. The cost of £1,414,000 was considerably higher than the estimate, as the station was placed further up-stream than had been planned in order to avoid interfering with rock carvings, some dating back to 2,000 B.C., which depicted the life of prehistoric hunters and fishermen.

Three more big power plants are at present being built, or planned, on the Angerman River and its tributaries. One of them, situated on the Forsmo rapids, is expected to have one turbine in operation next spring; a second generator will bring its capacity up to 75,000 kW. The Power Board proposes, in 1948, to begin building the 180,000-kW Kilforsen (Kil rapids) station on the same system; the five-mile (8 km) discharge tunnel will be the longest in Sweden.

A company proposes to complete a 165,000-kW plant on the Faxalven River by 1951. The first of three 55,000-kW sets, to be installed at a depth of 270 ft (82 m), is expected to be in use in May, 1949. The discharge tunnel will be 4½ miles (7·2 km) long.

The biggest plant under construction is at the Harspranget Falls on the Lule River, north of the Arctic Circle. It was announced in November that three 105,000-kVA, 167-r.p.m. generators will be installed—a capacity exceeded for hydro stations only by the 108,000-kVA generators at Grand Coulee in the United States. The stator diameter will be 32 ft (9·8 m) and the total weight about 800 tons. This station is expected to start operating in 1950 with a daily minimum output of over 6 million kWh. As announced in the *Electrical Review* of 21st November, it is to be visited next June by the World Power Congress on Large Dams.

**Tied "Live" Wires to Body.**—At an inquest at Newport (Mon.) on a former electrician's assistant it was stated that he had been found partly unclothed in a locked bedroom with "live" wires attached to his head and bare body. A verdict of "Suicide while the balance of his mind was disturbed" was recorded.

# Water-Tube Boilers

## Design and Operation

IN a paper read before the Scottish Engineering Students' Association, which dealt with modern developments in natural-circulation water-tube boilers for power stations, MR. ERIC YARROW stated the aims of boiler designers as high efficiency, good availability, rapid circulation, accessibility for cleaning and reliability. The three essentials of combustion he gave as temperature, turbulence and time, but very high heat-release rates should be avoided in the interest of availability.

As much boiler surface as possible should be exposed to radiant heat, since more heat could thus be transmitted per unit surface (in proportion to the fourth power of the absolute temperature) than by convection. The higher the fusion point of ash, usually from 2,000 to 2,600 deg F (1,093 to 1,427 deg C) in this country, the higher the permissible temperature in the furnace. Water walls kept the temperature of gas entering the tube banks below the fusion point of ash and also provided additional radiant-heating surface.

Refractory arches, usually of the suspended type, were installed with chain-grate stokers in order to obtain quick ignition and complete combustion. With high-volatile fuels and increased use of secondary air, "archless" settings were often fitted. A water-tube boiler, although adaptable, should be designed to burn a particular type of fuel with definite characteristics, but under present conditions calorific values down to 7,000 B.Th.U. per lb (3,889 cal per kg), volatile content of as little as 6 per cent, ash up to 30 per cent and varying proportions of moisture had to be dealt with.

### Types of Deposit

External deposits were found most frequently in the hottest and coldest parts of the gas passages. The commonest types were:—Bird-nesting due to fusion of fly-ash on the tubes caused by too high a furnace temperature, which was removable by scraping, wire-brushing and soot-blowing; bonded deposits caused by sodium and potassium sulphates becoming sticky at high temperatures, removable by washing; phosphatic deposits from phosphorus attack on fly-ash, which were less common but more difficult to remove. Deposits in lower-temperature zones occurred when tube temperatures were below the dew point of the gases, and moisture condensed forming sticky surfaces on which dust particles collected. On-load cleaning was normally effected by permanent multi-jet steam blowers in the lower-temperature zone and by single-nozzle retractable blowers where gas temperatures were high. Soot blowers were often automatically controlled by electrical or hydraulic means at about double the cost of hand operation. Water-lancing (sudden chilling) was often used to remove deposits which had resisted soot-blowing. Off-load cleaning was now often done by water washing.

Discussing the various features of boiler construction, the author stated that drums were being more extensively welded with improved methods of X-ray and radiograph technique. Superheaters now absorbed about a quarter of the heat produced in the furnace. The convection superheater had a rising characteristic and the radiant type a falling one, so the two were combined; the self-draining superheater had considerable advantages over the non-draining kind when starting up which seemed to outweigh the more difficult constructional problems it entailed. Preheated air for mechanical stokers should not exceed 300 deg F (149 deg C), but for pulverized fuel temperatures could be 600 deg F (315 deg C) for drying the coal. Evaporation up to 270,000 lb (122,500 kg) per hr could be obtained with twin mechanical stokers.

Spreader stokers consisted essentially of a feeder pushing the coal from the hopper on to rotors which threw the coal into the furnace, the smaller particles being burnt in suspension and the larger on the grate. Automatic control of boilers, it was sometimes claimed, improved day-to-day efficiency by 3 per cent.

The paper concluded with particulars of six-hour tests after fourteen months' running on one of the eight 100,000 lb (45,400 kg) per hr boilers (m.c.r.) installed in March, 1944, at the Clyde's Mill power station of the Clyde Valley Electrical Power Co. These showed a net overall thermal efficiency, after deducting heat absorbed by auxiliaries, of 87·9 per cent (84·5 per cent guaranteed) at normal evaporation of 80,000 lb (36,300 kg) per hr.

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## Oil-Engine Working Costs

THE report on heavy-oil engine working costs, which is compiled annually by the Diesel Engine Users' Association, includes returns from 58 stations in 1945-46, six more than in the previous year, due to more assistance given by overseas members. The average fuel consumption fell to 0·6 lb per kWh generated, being 7·25 per cent below the "standard" figure; the average running plant load factor decreased slightly to 62·2 per cent. A considerable number of stations used less lubricating oil than the accepted figure, the average of 2,500 b.h.p.-hours per gallon being the highest so far attained. The 28 home stations containing 117 engines of 32,910 kW carried a maximum load of 21,338 kW and generated 26·3 million kWh at an average engine cost of 1d. per kWh produced.

# NEW BOOKS

## Careers in the Electrical Industry. Modern Direction-Finding Practice.

**Electrical Engineering—Scope, Training and Prospects.** By Frederick W. Purse, M.I.E.E., M.I.Mech.E. Pp. 104. Southern Editorial Syndicate, Ltd., 55, Turnmill Street, London, E.C.1. Price 5s.

Present-day opportunities for study, education and training, the author truly states, were not available to our forefathers. Neither, unfortunately, was the kind of advice given in this book, which sets out for the benefit of young people or their guardians the ever expanding opportunities offered by electricity as a career and how to make the most of them and answers such questions as the age at which training should commence and for how long it should continue. After touching on elementary education, he furnishes particulars of the qualifications necessary for membership of the Institution of Electrical Engineers and of the facilities for technical education provided by the universities and technical colleges.

Under the heading of practical training come outlines of the schemes devised by many manufacturers, contractors, the G.P.O. and the B.B.C., which show, as Mr. Purse points out, that lack of financial means need no longer be a deterrent. The number of distinct branches of electrical engineering open to entrants is not always realized. The scope in each is discussed, whether for the craftsman, the technician or the professional engineer, including teaching and technical journalism.

In addition to providing the more usual information, numerous useful hints are given on such matters as applying for posts, planning roughly a career, gaining variety of experience while young without becoming a "rolling stone," reasons for sport and social activities, and the best use of technical journals and manufacturers' publications. Based upon the experience of a lifetime of one who has held leading positions in the electrical industry, this book can be recommended to its intended readers, for whose proper aspirations the author has evidently a strong sympathy.—C.O.B.

**Wireless Direction Finding.** By R. Keen (Fourth Edition). Pp. 1059 + xii; Fig. 632; index. Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. Price 45s.

It may be said with some confidence that there is not much wrong with a technical book which has survived twenty-five years' progress in such a rapidly advancing subject as radio and now justifies a fourth edition. The fact that the third edition was reprinted four times during the war years, 1941-44, is sufficient in itself to indicate the great interest which is taken in the matter of determining the direction of arrival of radio waves from a remote sending station.

In spite of the introduction of radar, followed by some spectacular developments in systems of position finding for navigation and other purposes, there were many wartime developments in direction finding, most of which have until recently been described only in confidential documents. The author has been wise in excluding radar technique from the present work and in his introductory chapter he gives ample justification for confining the book, almost exclusively, to what he terms C.W. direction finding: albeit the possibilities of pulse transmissions for improvement in the presentation of bearings by ray separation are dealt with briefly in Chapter 16.

Compared with the previous edition, one new chapter has been added; it describes the newer radio navigation systems, including Gee, Loran, Decca and Consol, some of which incidentally use pulse modulation techniques. The remaining chapters have been brought up to date and much useful new material has been added on the calibration of direction finding systems and on the statistical study of bearing errors and classification. Chapter 12, on "Wireless Beacon Systems" has been suitably enlarged to deal more fully with recent developments, notably in the United States, in the application of the radio range system at very high, as well as at medium, frequencies for the guidance of civil aircraft. Here, as elsewhere in the book, some of the systems and equipment described have become obsolete, but the author has been wise to retain the material in order that the book may continue to form a comprehensive, practical manual on the subject of direction finding, which, it may be fairly claimed, is without a rival in the field of technical literature.

Although the present book contains over 1,000 pages, it is quite handy in size, but it seems clear that in view of the growth of published literature on the subject, which is still taking place, the author will need to consider very seriously whether he should divide the next edition into two volumes. For the present, however, the book with its valuable bibliography, now containing over 400 references, can be strongly recommended to all students, engineers and operators who are concerned with the practice of this subject.—R.L.S.-R.

**Unit Heaters.** By S. E. Nelson. Pp. 22; 13 figs. Emmott & Co., Ltd., 31, King Street West, Manchester. Price 1s. 6d.

This addition to the "Mechanical World" monographs (No. 40) concisely differentiates between the several kinds of unit-type air heaters, with suggestions about methods of installing them and some comparison with other means of general space warming and ventilation.—W.O.F.

# Lighting in Kingsway

## Demonstration Fluorescent Installations

KINGSWAY, one of the principal thoroughfares in Central London, has hitherto been lighted entirely by gas, but the Holborn Borough Council, which has been interested in fluorescent lighting since its first introduction for street lighting, requested the British Thomson-Houston Co., Ltd., and the General Electric Co., Ltd., to undertake a demonstration installation in a section of Kingsway, and this was switched on by the Mayor of Holborn on Monday last week. The improvement in the illumination of this section of this important thoroughfare is so marked, especially when compared with the sections still lighted by gas, that the time cannot be far distant when the remainder of Kingsway will be changed over to the new form of lighting.

Each company has installed six lanterns, two on each side of the road and two in the centre, at spacings of approximately 82 ft (25·1 m) and 100 ft (30·5 m) and at a mounting height of 25 ft (7·6 m). They are mounted on concrete standards manufactured by Concrete Utilities, Ltd., especially for fluorescent lighting.

**Demonstration fluorescent lighting installations in Kingsway, London, W.C.2**

The G.E.C. installation which embraces that part of Kingsway in which the company's head office, Magnet House, stands, provides an intensity of 6,800 lumens per 100 ft of each carriageway, or a total of 13,600 per 100 ft of the complete road. Each lantern is of non-ferrous construction and houses four 5-ft (1·5-m) 80-W Osram "Daylight" lamps, two on each side, of which the bottom two can be switched off for half night lighting. A twin lamp circuit is employed to give unity power factor for full or half night lighting. All the auxiliary gear is grouped at the top of the lantern underneath the canopy, while maintenance is further simplified by the provision on either side of a hinged door glazed with "Perspex" acrylic sheet. Each door is fitted with two hinged stays. An innovation is the design of the lanterns mounted in the centre of the road. The centre standards carry only a single four-lamp lantern, of which one half projects over each carriageway. These lanterns are virtually split down the middle and are erected in two halves, one each side of a concrete head. The two halves, each containing two lamps, are bolted together through the concrete head which thus does not obstruct the light.

The installation in the northern sector of the road has been planned by the British Thomson-Houston Co., Ltd. "Mazdalux" fluorescent street lighting lanterns, mounted at a height of 25 ft, are spaced two at each side of the roadway and two along the centre, at intervals of approximately, 82 ft. These lanterns are designed for use with three "Mazda" 80-W 5-ft fluorescent lamps, a separate reflector being employed for each lamp, and are so arranged that the bottom lamp can be used alone for late-night economy lighting. The two lanterns along the centre of the roadway are fitted with special brackets by which they are fixed to the attractive circular heads in which the columns terminate. Each lantern is of silicon-aluminium alloy construction, with a translucent plastic cover which protects lamps and reflectors from dust and the weather. Auxiliary gear is accommodated within the lantern and hinged end covers facilitate lamp changing and starter switch maintenance, without disturbing the "Perspex" cover.

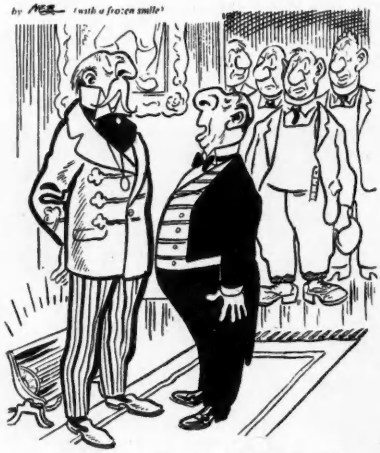
With an average output of 6,380 lumens over lamp life, 5,840 lumens are provided per 100 ft linear in each half-carriageway. By the incorporation of the special B.T.H. anti-glare shields, however, 97 per cent (5,660 lumens) is usefully employed by being directed into the lower hemisphere. The figure for the full width of road would, of course, be 11,320 lumens per 100 ft linear. Undesirable shadow is eliminated and, despite the high efficiency of the lamps, there is a marked absence of glare. The large light source gives a very wide and even distribution of light over an area comprising the road, pavement and lower parts of adjacent buildings.

Electricity for the new lighting installation is provided by Central London Electricity, Ltd.

# E.D.A. Economy Campaign

### Appeals to Non-Industrial Consumers

AS the first step in a long-term campaign for economy in the use of electricity during the next few years the British Electrical Development Association is embarking on a new advertising campaign aimed at reducing domestic and non-industrial consumption during peak hours. In an explanatory circular to its members E.D.A. declares that the Council is firmly of the opinion that the industry's first aim must be to secure that electricity supply and service shall be maintained as free as possible from restriction.




*"A deputation from the Local Works, Sir Hubert, with reference to the electric fire. I am asked to request you to turn it up, by which I understand them to mean 'off'"*

**Cartoon drawn by Neb in connection with the E.D.A. electricity economy campaign**

It is suggested that during the next three months a concentrated and united appeal should be made by all electricity supply undertakings, directed especially to domestic and non-industrial consumers, that the industry's message should embrace at least one point which consumers might be expected to interpret as an incentive, and that special emphasis should be given to the electrical aspects of the problem, e.g., plant shortage and peak difficulties.

Some of the ways in which consumers can help with the minimum inconvenience to themselves are detailed in a draft letter, which points out that electricity cuts can be avoided if water heaters are switched off between 7 a.m. and 7 p.m., if wash boilers are used on Saturday, if ironing is done in the evening, if unnecessary lights are switched off, if radio sets are turned off when no one is listening, if the electric fire is switched off when the electric cooker is in use and if the use of electric fires is restricted to one room at a time. Special emphasis is laid on the need for switching off electric fires during peak periods.

In connection with the accompanying press advertising, cartoons have been specially prepared by over a dozen cartoonists including Fougasse of *Punch*, Lee of the *Evening News*, Illingworth and Neb of the *Daily Mail*, Grimes of the *Star*, and David Langdon. Other supporting items of publicity, including posters, stickers, folders, meter cards and window bills, are being prepared.

# Coal Production

### Measures for Improvement

AT a press conference last week Lord Hyndley, chairman of the National Coal Board, outlined the steps which the Board was taking to increase the production of coal and improve its quality. In the course of his remarks he said that in 1946, 677 coal cutters were delivered to the collieries; the 1947 figure was put at 800 and deliveries planned for 1948 exceeded 1,000. The corresponding figures for conveyors were 1,982 (actual), 2,900 (provisional) and 4,000 (planned) and for mine locomotives 28,77 and 155 respectively.

Coal-face lighting improvements were being studied, particularly the use of fluorescent lamps. A 2-ft tube in a flameproof fitting had been developed and the first experimental installation (at Chislet Colliery, Kent) had been in successful operation for some weeks.

In an endeavour to improve quality short-term measures had been taken, including the overhaul and adjustment of equipment, a more even distribution of coal to cleaning plants, closer supervision and better lighting. It was claimed that much improvement had already become evident. The Central Electricity Board recently stated that for the first time for a number of years the loss of power-station capacity due to the use of unsuitable coal had been returned as less than 200,000 kW. During 1946 the loss was occasionally as much as 380,000 kW.

Lord Hyndley pointed out that while coal production had decreased, consumption in power stations had risen sharply. The stations were receiving as much good coal as they got before the war but the balance of their requirements had to be made up in untreated coals, and untreated slacks in particular.

# COMMERCE and INDUSTRY

## Electric Vehicle Output.

THE growing popularity of the electric vehicle is indicated by the fact that Ministry of Transport returns show that while 867 new "electrics" were registered in 1938, the registrations were 1,415 in 1946 and for the first ten months (January to October) of 1947, they totalled 2,285. These figures do not include the pram type of vehicle, 1,086 of which were registered in January-October, compared with 1,205 for the whole of 1946.

The considerable advantages of the electric vehicle are set out in a 16-page illustrated brochure, printed in six colours, entitled "How to Reduce your Delivery Costs," which has been published by the Electric Vehicle Association of Great Britain, 2, Savoy Hill, W.C.2. Examples of the various types of battery vehicles are illustrated, and details are given of their performance, maintenance, driving, general reliability, and approximate cost of running. It is also pointed out that the premiums for this class of insurance are much lower than for any other mechanically-propelled vehicle.

## Meters Approved

The London Gazette for 19th December contains a list of meters approved by the Electricity Commissioners, the first published since 1939. This covers meters made by all the well-known manufacturers including the following companies:—Ferranti, Ltd.; Aron Electricity Meter, Ltd.; British Electric Meters, Ltd.; British Insulated Callender's Cables, Ltd.; Sangamo Weston, Ltd.; Chamberlain & Hookham, Ltd.; Crompton Parkinson, Ltd.; Siemens-Schuckert meters supplied by Robert Hornby & Co., Ltd.; Landis & Gyr, Ltd.; Metropolitan-Vickers Electrical Co., Ltd.; Smith Meters, Ltd.; Venner Time Switches, Ltd.; A.E.G. Electric Co., Ltd.; Kandem (Manufacturers); Rex Meters, Ltd.; and Siemens Bros. & Co., Ltd.

## Refrigerator Maintenance Course

A short course on refrigerator maintenance for members of maintenance staffs of undertakings in the S.E. & E. Area organized by E.D.A. was held on the 15th, 16th and 17th December in the Kingsway Hall, W.C.2, the number of those attending being about 150. Manufacturers co-operated in providing instructor lecturers, the subjects covered being the first principles of refrigeration, the general maintenance of refrigerators, and the operation and maintenance of the refrigerators designed for the Government's prefabricated dwellings. During the course, Mr. V. W. Dale, the general manager and secretary of E.D.A., gave an address in which he welcomed those attending. The speakers at the various sessions were Mr. C. J. Woodmore (Frigidaire, Ltd.), Mr. R. Warburton (B.T.H. Co.), Mr. L. W. Inwood (Electrolux), Mr. H. Edginton (Pressed Steel Co., Ltd.), and Mr. E. A. Friday (J. & E. Hall, Ltd.). At the end of each session, adequate time was given to questions and discussion.

## Purchase Tax Changes.

## "Geneva" Tariff Concessions

The *Board of Trade Journal* for 20th December contains a list of goods which are subject to lower import duties upon entry into the United Kingdom as from 1st January. The concessions are made under the Geneva tariff agreement and relate to the most-favoured nation tariff. Included in the list, are desk and wall telephone instruments, teleprinters and morse instruments (from 15 to 10 per cent); electric cooking and heating apparatus (from 18 to 10 per cent); power-operated coal cutters and winders (from 20 to 15 per cent); welding machinery (other than tube-making machinery) (from 20 to 15 per cent); and power-operated cranes, hoists, winches and lifts (from 20 to 15 per cent).

## New Philips Company

Philips Electrical Industries, Ltd., has been formed as a holding company with a capital of £2,500,000 to acquire and hold certain shares of the Philips group of companies in Great Britain. It is purely internal reorganization and regrouping, and has no external implications. The registration of the company is recorded elsewhere in this issue.

## Purchase Tax on Domestic Appliances

The Treasury has made an Order under Section 20 of the Finance (No. 2) Act, 1940 (Purchase Tax (Alteration of Rates) (No. 3) Order, 1947) which exempts from purchase tax domestic space heating appliances incorporating electric fans or electric pumps or both fans and pumps, designed to consume a total of not more than 100 W, but not including appliances otherwise electrically operated and not including appliances operated by gas. It also takes out of the intermediate rate (75 per cent) other space heating and water heating appliances which, although operating from electric or gas mains, do not use electricity or gas as the source of heat. The liability position of these appliances is restored to that obtaining before the Spring Finance Act of 1947, some becoming chargeable at the basic rate of 50 per cent of the wholesale value and others exempt.

Examples of articles which become exempt are:—Radiator and convector cabinets not heated by electricity or gas whose only electrically operated components are electric fans and/or electric pumps which do not consume in all more than 100 W; and solid-fuel-fired

water-storage heaters incorporating an electrically operated blower to increase the draught. Articles which become chargeable at the basic rate are air-conditioning appliances not using electricity or gas as the source of heat, but incorporating electrically-operated components other than fans or pumps, such as, humidifiers, filters, sprays, etc.

The Order applies to goods which are delivered on sale, or appropriated to retail trade or similar purposes, on or after 29th December, 1947, or, in the case of imported goods, which are entered with the Customs or delivered from bonded warehouse for home consumption, on or after 29th December.

## Irish Electricity Board Fined

As a result of the death of an employee from electric shock the Irish Electricity Supply Board was summoned in the Dublin District Court recently. It was stated that the employee, contrary to instructions, had entered a h.v. cubicle in a factory when he had been told to clean a l.v. cubicle. He came into contact with a transformer and was killed. He had been able to enter the h.v. cubicle because the same key fitted both locks, a circumstance which was adversely commented on by the judge, who fined the Board £1 with one guinea costs.

## Darwen District Heating Scheme

A meeting of Darwen ratepayers has approved a £500,000 district heating scheme and a Bill is to be promoted in Parliament to authorize it, and to provide for the raising of the necessary money. The scheme will provide heat on tap to houses and works. Whereas the average householder spends 5s. 8d. weekly on electricity, gas and coal, he will be able to have every room heated for 4s. 7d. a week. In thirty years, the undertaking should be debt free. Mr. A. Watson, the borough electrical engineer states that Darwen is ideally situated for the scheme. Pollution by smoke would be reduced enormously and pipelines could be laid over or in the ground. From 65 to 75 per cent of coal heat would be available instead of a normal 20 to 30 per cent. At the inauguration of the scheme in 1952 heat would be sold at not more than 4½d. per therm. This would be reduced as the project developed.

## A.M.E.E. Sales Sub-Committee

On 2nd December the Sales Sub-Committee of the Associated Municipal Electrical Engineers (Greater London Centre) celebrated its twenty-first "birthday" at the London Lighting Service Bureau. The subject of the discussion was, "An Inexpensive Method of Checking Load Limitation in Connection with Load-spreading Problems." The discussion was opened by Mr. J. R. Kinnersley (West Ham Electricity Department), who introduced the prepayment meter which has been adapted for the purpose by the West Ham undertaking. During the meeting, Mr. F. W. Purse, the originator of the sub-committee, was welcomed, and later the majority adjourned to Slater's Strand Restaurant where they had tea. The occasion concluded with a visit to "Worm's Eye View" at the Whitehall Theatre.

## Reports on German Industry

Latest reports on German industry, copies of which can be obtained from H.M. Stationery Office, include the following:—B.I.O.S.1324. "German Radio Frequency Cables" (12s. 6d.). B.I.O.S. 1530. "Investigation of German Methods of Rubber/Metal Bonding." (8s.). F.I.A.T. 1127. "Report on the Flexible Shaft Industry in Germany." (5s. 6d.). F.I.A.T. 1163. "The Telephonograph Recording System." Report in German. (5s. 6d.) F.I.A.T. 1158. "Some Wartime Experiences of the Berlin Power & Light Co. (Bewag)." (3s.). F.I.A.T.1183. "Compensation of Ground Current Through Petersen Reactors and their Application in the Bewag 30-kV Network." (2s.).

## Welding Prize

The Council of the British Welding Research Association has accepted an offer from the British Oxygen Co., Ltd., to provide a prize fund of £100 per annum for three years for a welding competition. A single prize of £100 is offered in 1948 and will be awarded for the best paper submitted on a research into welding or its application. Papers will require to be submitted on or before 30th September, 1948. Full particulars will be announced shortly.

## Shoreditch Jubilee

In July last year the Shoreditch Borough Council electricity undertaking celebrated its Jubilee, the celebrations including a civic dinner, a social evening for the staff of the Electricity Department, and an exhibition showing the undertaking's activities during the past fifty years. Mr. R. H. Rawll, the borough electrical engineer and general manager, has now sent us a copy of a souvenir brochure which outlines the history and development of the undertaking and includes a number of illustrations of some of the early plant installed and plant in operation today.

## Newcastle (N.S.W.) Industries

We have received from Mr. G. Allbut, electrical engineer and manager of the Newcastle (N.S.W.) Electric Supply Department, a copy of a brochure "Newcastle—Industrial Capital of Australia," containing a photographic and documentary presentation of Newcastle's industrial achievements. This brochure has been produced for world circulation and calls the attention of manufacturers to the facilities which the city offers. The publication of the brochure coincides with the fiftieth year of the Electric Supply Department, and the section

dealing with the services available to industry, describes the development of the undertaking and the service it is prepared to give to manufacturers. Mr. Allbut says that inquiries by manufacturers addressed to him at Nesca House, Newcastle, N.S.W., will receive his personal attention and early acknowledgment.

## Clarence Dock Strike

When shift workers at Clarence Dock power station, Liverpool, were on strike on Christmas Day and Boxing Day, the supply of electricity was maintained by clerical workers and members of the administrative and maintenance staffs. The strike did not have the support of the men's unions and Mr. J. Eccles, the city electrical engineer, stated that the officials of the trade unions concerned had done everything they possibly could to avoid the strike, including the bringing of senior officials from London. The men were dissatisfied with their terms of employment under the J.I.C. agreement for the industry, which provides that rotating shift workers are paid 4d. per hour above the corresponding grade of day worker for every hour worked during the year; consequently no extra or enhanced rates are payable in respect of night, Sunday or holiday work. Previously the men were paid double time rate for public holidays. The night shift men returned to work at 10 p.m. on Boxing Day.

## Lighting Glass at the B.I.F.

The leading British manufacturers of lighting glass are acting co-operatively in staging an exhibition of British lighting glass at this year's B.I.F. The exhibit will be primarily designed to cover the export field.

## Scottish Trade Fair

An annual Trade Fair to be held in some leading Scottish city is planned by the Scottish Chamber of Commerce, and the Scottish Council (Industry and Development) has been asked to undertake the organization.

## Northampton Electrical Association

Messrs. G. Middleton and F. H. Lealand, of the British Thomson-Houston Co., presented a paper on "Fractional Horse Power Motors and their Applications" to members of the Northampton & District Electrical Association, at their December meeting. The first part of the proceedings took the form of a survey of the types and uses of motors. This was supported by the use of lantern slides. The second part consisted of a question period when questions of a technical nature were ably answered.

## Television in the United States

Mr. Frank E. Mullen, executive president of the National Broadcasting Company, says that before the end of 1948 his network expects to bring television programmes within the reach of areas with a total population of 22 million people and within another year or eighteen months a further 20 million people living east of the Mississippi river will have network television programmes available to them.

A television network 500 miles long between Boston and Washington capable of reaching a potential audience of 25 million people has just been demonstrated by the American Telephone & Telegraph Co. It is the longest television system ever assembled and has been made possible by the inclusion of the company's new microwave radio relay circuit between New York and Boston, which has been in the course of construction for several years.

## Trade with Russia

On Sunday last the trade agreement between this country and Russia was signed in Moscow. From Russia the principal export will be coarse grain for animal fodder. Great Britain has undertaken to supply railway equipment, machinery for the timber industry and electrical plant, including mobile power stations.

## E.A.W. Activities

The Councillor Miss Walter rosebowl has been won by the S.E. Essex County Technical School, which gained the highest average marks in the schools' examination for the E.A.W. home workers' certificate in 1947.

The E.A.W. is reviving the essay competition for the Lady Mount Temple cup, run annually before the war for schools affiliated to the Association. The title for the essay is "Electrical Pioneers," and the closing date for entries is 17th March. Cash prizes will be awarded, and the school of the first prize winner will hold the cup for 1948.

## Electrical Suppliers' Progress

Metway Electrical Industries, Ltd., Brighton, commenced operations in 1937 under the title of Metropolitan Electric Supplies, and the rapid progress which the company has made in the past ten years is shown in an illustrated brochure which it has just issued. To commemorate its tenth year, the company held a dinner dance at the Savoy Restaurant, Brighton, on 20th December.

## L.M.S. Scientific Research

The London, Midland & Scottish Railway Co. has issued a descriptive brochure for the guidance of visitors to its scientific research laboratory at Derby. This describes the various sections of the laboratory and includes some excellent illustrations.

## Canadian Electrical Apparatus Tax

Three Canadian electrical appliances manufacturers have announced that they will absorb some of the 25 per cent tax recently imposed on

electrical goods. Price increases are expected to be as follows: radio sets, valves and gramophones, from 10 to 12½ per cent, cookers 10 per cent; refrigerators, vacuum cleaners, irons, toasters and kettles, 20 per cent. There will be no change in the prices of electric washers, clocks, blankets or humidifiers.

## Sheffield Celebrates Jubilee

Celebrations planned this month to mark the completion on 1st January of fifty years' municipal ownership of the electricity undertaking in Sheffield will include the starting up of the first of two 50-MW turbo-alternators forming part of the Neepsend generating station extensions now ready for commissioning. On 9th January the Lord Mayor, Alderman W. E. Yorke, J.P., will open a Jubilee Electrical Exhibition in a marquee at the corner of High Street and Change Alley. This exhibition will be open for two weeks. On the same day a dinner will be held at the Town Hall at which the Lord Mayor of Sheffield will be host, the Minister of Fuel and Power, Mr. Hugh Gaitskell, Sir John Kennedy, Mr. V. A. Pask and Mr. W. M. Lapper being among the distinguished guests. The starting-up ceremony will be performed the next morning by the Minister of Fuel and Power and after the ceremony the party will visit the Blackburn Meadows station, where it will be entertained to lunch by the Electricity Committee. In the following week both Neepsend and Blackburn Meadows stations will be open to the general public on Sunday to Thursday inclusive. The employees of the Electricity Department are to be invited to celebrations to be held in the City Hall on the evenings of 20th and 21st January.

## West Gloucester Company's Report

The West Gloucestershire Power Co., Ltd., has issued to its employees a copy of its report on the financial results for 1946. This is printed in colour and in addition to giving financial statistics it contains details showing how the company's revenue is obtained, the various items which go to make up the total expenditure, the growth of the undertaking, and illustrations of some of its substations.

## Calendars and Diaries

A view in colour of its head office and works at Leatherhead forms the subject of this year's calendar of the British Vacuum Cleaner & Engineering Co., Ltd.

An "everlasting" jotting pad has been received from the General Accessories Co., Ltd. This has a brown leather binding and behind the jotting pad is a picture of the company's "Surrey" micro-break a.c. switch.

Brookhirst Switchgear, Ltd., has chosen a series of photographs which depict some of the men and women who contribute to the production of the company's switchgear.

A cut out of one of its synchronous time switches forms the calendar received from Venner Time Switches, Ltd.

## Copper-alloys Glossary

The definitions in the newly issued glossary of terms (BS.1420) applicable to wrought products in copper, zinc, brass and other copper alloys are related to commercial practice, with due regard for Customs definitions; hence the omission of certain terms and the drafting of several of the definitions in a manner that is less precise than the usual British Standard terminology. Additional sections are to be published in due course relating to raw materials, cast shapes and, possibly, to certain fabricated products. The document is obtainable for 2s. from the British Standards Institution, 24, Victoria Street, London, S.W.1.

## Trade Publications

**Murex, Ltd.,** Rainham, Essex.—Leaflet on metal powders for making welding electrodes.

**Watson & Sons (Electro-Medical), Ltd.,** 43, Parker Street, Kingsway, London, W.C.2.—Brochure (No. 824) on ultra-violet and infra-red therapy lamps with separate price list (sheet 19-847).

**Kupfer Distributors, Ltd.,** 38, Glasshill Street, London, S.E.1.—Wholesale catalogue of "EFE" moulded plugs and sockets, switches and switch-sockets.

**B.E.N. Patents, Ltd.,** High Wycombe, Bucks.—Illustrated folder (CB.87) giving details of paint spraying guns and compressors.

## Trade Announcements

**John Phillips & Co. (Electrics)** have removed to Clydesdale Works, 32, Park Road North, Acton, W.3.

**The Holland House Electrical Co., Ltd.,** has opened a store as a sub-branch of its Dumfries depot at Crown and Anchor Lane, Scotch Street, Carlisle.

**Taylor Electrical Instruments, Ltd.,** announce revised prices as from 1st January.

# Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers, which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

**Malayan Union.**—A qualified electrical engineer in Kuala Lumpur wishes to act as technical agent for British electrical manufacturers, to give advice upon maintenance, repairs, etc. (X.195.)

# Overseas Electrical Trade

## Record Shipments of Communication Equipment

DESPITE the fact that November included two fewer working days and one more Saturday than October the value of exports of electrical equipment last month, at £7,066,357, was £289,108 higher. This figure is less than the record totals of July (£7,333,719) and September (£7,318,093) but is almost up to the monthly target of £7·1 million which Sir Stafford Cripps put forward in September to be aimed at for the fourth quarter of 1948.

This satisfactory result is due to a considerable extent to a record shipment of telegraph, telephone and signalling apparatus. Of the total of £759,029, South Africa took £126,077 worth and Australia £100,220 worth. Exports of generating plant were also heavy, particularly of equipment exceeding 200 kW, which was valued at £351,496. Parts for generating plant (£248,707) were much in demand. India (£158,058) and Australia (£128,361) accounted for nearly half of the total generating plant exports (£755,748). Just over £300,000 worth of the

**Table I.—Electrical Exports and Imports**

| Class | Exports | | | Imports | | |
|---|---|---|---|---|---|---|
| | Nov., 1947 | Nov., 1946 | Monthly Av., 1938 | Nov., 1947 | Nov., 1946 | Monthly Av., 1938 |
| | £ | £ | £ | £ | £ | £ |
| Telegraph and telephone wires and cables, submarine | 6,981 | 133,277 | 17,289 | | | |
| Ditto, not submarine | 383,004 | 203,118 | 71,803 | | | |
| Wires and cables, other than telegraph and telephone, rubber insulated | 500,704 | 312,019 | 117,533 | 11,947 | 3,209 | 31,246 |
| Ditto, insulation other than rubber | 375,902 | 351,462 | 153,256 | | | |
| Comercial radio apparatus | 152,921 | 129,222 | 28,296 | * | * | * |
| Domestic radio receivers | 318,665 | 477,407 | 36,755 | 2,648 | 5,661 | 10,148 |
| Telegraph, telephone and signalling apparatus | †759,029 | 541,581 | 242,716 | 1,773 | 2,152 | 9,243 |
| Other radio, etc., apparatus | 322,793 | 149,425 | 57,848 | 22,469 | 94,113 | 47,870 |
| Valves | 155,194 | 258,706 | 41,272 | 22,653 | 54,084 | 10,893 |
| Electric carbons, furnace | * | * | * | 29,077 | 12,812 | 4,054 |
| Other electric carbons | * | * | * | 17,482 | 2,915 | 2,301 |
| Electric lamps | 110,810 | 100,296 | 49,440 | 3,761 | 490 | 10,265 |
| Other lighting apparatus | 289,110 | 221,635 | 48,565 | 9,102 | 1,976 | 38,662 |
| Primary batteries | 69,806 | 61,468 | 13,572 | 7,299 | 1,983 | 3,549 |
| Accumulators for motor vehicles | 126,725 | 85,965 | 16,418 | * | * | * |
| Ditto, other portable | 63,995 | 41,587 | 12,456 | * | * | * |
| Ditto, stationary | 9,779 | 13,953 | 19,773 | * | * | * |
| Ditto, parts and accessories | 56,416 | 54,087 | — | * | * | * |
| Electric cooking and heating apparatus | 232,504 | 156,578 | 30,664 | * | * | * |
| Commercial electrical instruments, including ammeters, voltmeters, etc., and parts | 86,884 | 111,270 | 15,878 | | | |
| House service meters | 129,703 | 63,897 | 15,791 | 14,078 | 11,876 | 32,057 |
| Other electrical instruments | 80,913 | 67,342 | 9,612 | | | |
| Electro-medical apparatus other than X-ray | 22,372 | 11,818 | 3,038 | * | * | * |
| X-ray apparatus, vacuum tubes and parts | 60,776 | 83,521 | 4,881 | 36,516 | 11,298 | 9,734 |
| Insulating materials, not elsewhere specified | 109,102 | 132,652 | 19,343 | * | * | * |
| Unclassified electrical goods and apparatus | 270,708 | 373,536 | 108,083 | 27,964 | 12,170 | 52,980 |
| Generators, complete, up to 200 kW | 155,545 | 122,768 | 38,071 | * | * | * |
| Ditto, over 200 kW | 351,496 | 263,735 | 119,079 | * | * | * |
| Ditto, parts | 248,707 | 66,589 | — | * | * | * |
| Railway and tramway motors | 78,939 | 29,331 | 15,977 | | | |
| Other motors up to ½ h.p. | 46,876 | 40,895 | 9,001 | | | |
| Ditto, over ½ h.p. but under 1 h.p. | 33,972 | 18,673 | 2,470 | 14,240 | 3,069 | 26,033 |
| Ditto, 1–250 h.p. | 297,389 | 176,788 | 96,637 | | | |
| Ditto, over 250 h.p. | 128,076 | 12,693 | 20,960 | | | |
| Converting machinery | 11,471 | 11,119 | 101,304 | * | * | * |
| Transformers including coils | 274,230 | 162,135 | | | | |
| Rectifiers for power house use | 11,531 | 14,974 | 3,463 | * | * | * |
| Motor starting and controlling gear | 113,497 | 178,856 | 50,866 | * | * | * |
| Switchgear and switchboards, other than telegraph or telephone | 396,649 | 386,975 | 184,533 | * | * | * |
| Other electrical machinery | 30,911 | 13,573 | 15,497 | 110,471 | 4,025 | 14,455 |
| Electric vacuum cleaners and parts | 171,140 | 164,716 | 26,662 | * | * | * |
| Other electrically-operated portable appliances | 21,132 | 63,257 | 10,394 | 10,203 | 1,358 | 24,627 |
| Total | 7,066,357 | 5,864,899 | 1,829,198 | 341,683 | 223,191 | 328,117 |

* Not classified separately. † The figures for 1947 are not strictly comparable with those for previous years.

electric motor exports went to countries outside the Empire.

Reference to our table showing the distribution of exports of electrical goods and apparatus reveals that there has been a very large falling-off in the shipments to India, the figure for November, £282,579, comparing with £666,178 in October and £816,723 in September. Despite this the total value of

**Table II.—Distribution of Exports of Electrical Goods and Apparatus**

| Destination | Nov., 1947 | Nov., 1946 | Monthly Av., 1938 |
|---|---|---|---|
| | £ | £ | £ |
| Eire | 289,084 | 109,435 | 37,726 |
| Channel Islands | 59,101 | 45,165 | 12,177 |
| Palestine | 185,438 | 92,365 | 8,426 |
| British West Africa | 71,242 | 57,215 | 12,889 |
| Union of South Africa | 607,893 | 540,124 | 162,584 |
| Southern Rhodesia | 78,140 | 36,971 | 9,632 |
| British East Africa | 88,309 | 17,882 | 7,893 |
| British India | 282,579 | 461,214 | 123,789 |
| Burma | 60,799 | 58,306 | 5,337 |
| British Malaya | 167,847 | 159,572 | 32,792 |
| Ceylon | 47,995 | 43,683 | 15,048 |
| Hong Kong | 55,673 | 50,332 | 12,939 |
| Australia | 278,409 | 207,928 | 197,366 |
| New Zealand | 254,181 | 188,030 | 96,225 |
| Canada | 26,749 | 55,283 | 12,547 |
| British West Indies | 69,757 | 39,923 | 12,954 |
| Other British Countries | 70,832 | 94,198 | 21,265 |
| Soviet Union | 27,454 | 169,212 | 36,781 |
| Finland | 62,671 | 20,206 | 5,969 |
| Sweden | 191,315 | 115,076 | 14,948 |
| Norway | 193,570 | 180,667 | 12,881 |
| Iceland | 5,890 | 22,873 | 2,796 |
| Denmark | 69,561 | 138,779 | 18,907 |
| Poland | 105,362 | 43,636 | 9,702 |
| Netherlands | 148,014 | 71,394 | 22,010 |
| Belgium | 89,773 | 138,020 | 11,208 |
| France | 71,711 | 180,721 | 16,082 |
| Switzerland | 26,285 | 37,724 | 3,768 |
| Portugal | 57,283 | 34,253 | 6,512 |
| Spain | 29,614 | 86,768 | 3,813 |
| Czechoslovakia | 26,398 | 12,339 | 7,256 |
| Yugoslavia | 1,720 | 5,831 | 1,475 |
| Greece | 66,074 | 19,163 | 4,926 |
| Turkey | 96,614 | 13,798 | 7,684 |
| Portuguese East Africa | 13,775 | 6,698 | 6,942 |
| Egypt | 53,410 | 90,386 | 13,176 |
| Iraq | 96,970 | 26,635 | 5,530 |
| Iran | 53,197 | 72,636 | 16,345 |
| China | 71,158 | 86,549 | 4,119 |
| United States of America | 13,369 | 8,091 | 5,839 |
| Mexico | 11,355 | 4,618 | 1,466 |
| Venezuela | 53,785 | 22,236 | 2,936 |
| Chile | 11,266 | 8,392 | 6,635 |
| Brazil | 65,011 | 67,163 | 11,164 |
| Argentine Republic | 92,263 | 43,778 | 45,452 |
| Other Foreign Countries | 195,900 | 152,554 | 46,371 |
| Total | 4,694,796 | 4,137,822 | 1,134,284 |

goods and apparatus exports at £4,694,796 shows a slight improvement on the previous month (£4,689,117) and is well above the November, 1946, figure.

South Africa, taking goods to the value of £607,242, was the largest customer, with Eire for the first time second with £289,084. After India as third (£282,579) the next largest were Australia (£278,409) and New Zealand (£254,181). Norway (£193,570) and Sweden (£191,315) were again the best foreign buyers, though Holland (£148,014) and Poland (£105,362) increased their demands considerably. Record purchases by Palestine amounted to £185,438.

In each of the classifications of cables South Africa was by far the largest importer. Palestine took £51,376 worth of the domestic radio receiver export total of £318,665, other important customers being Malaya (£27,059) and South Africa (£26,215). Telegraph, etc., equipment to the value of £126,177 and £100,220 went to South Africa and India, the latter also absorbing £52,878 worth of the accumulators dispatched (£200,499).

Imports of electrical equipment totalling £341,683 last month were up an insignificant amount (£5,881) compared with October and are now approximately on the same level as they were in 1938 when the monthly average was £328,117. "Other electrical machinery" at £110,471 accounted for a large portion of the total. Seven classifications were higher and nine lower than in the previous month.

## Australian Notes

A SITE for a large dam, the biggest of its kind in Australia, has been selected nearly 100 miles from the mouth of the Burdekin River, Queensland, and near to the Burdekin Falls, for a hydro-electric development scheme.

In Western Australia a Bill is before the Legislative Assembly which seeks to give power to municipal councils and road boards to order the owner of any premises within a quarter of a mile of an electric main to equip the premises with the proper electrical apparatus and wiring for lighting purposes. Actually the Bill was introduced because tenants in a street of houses within one mile of the Perth Town Hall were still using kerosene lamps, the owner refusing to have electricity installed.

Throughout the Commonwealth there is a serious shortage of heavy electrical plant, and although in the past preference has always been given to British tenders, efforts are now being made to secure such plant from the United States. The Prime Minister (Mr. Chifley) states that every assistance will be given, despite the dollar shortage, to enable plant of this kind to be obtained.

The Commonwealth Statistician reports that during the month of June the principal retail stores in Sydney had a sales turnover 38·2 per cent higher than that of June, 1946, and the sale of electrical goods increased by no less than 92·4 per cent.

A new company is being formed by Metal Manufacturers Ltd., in association with Standard Telephones & Cables Pty. Ltd., to expand the manufacture of telephone cables.

# ELECTRICITY SUPPLY

## Tariff Revisions. Power Station Interconnection.

**Blackburn.**—REBATES.—The Electricity Department has sent credit notes to members of Blackburn Chamber of Commerce who claimed a rebate on the maximum demand charge after power cuts earlier in the year.

**Bradford.**—HIGHER DOMESTIC CHARGES.—An increase in the price of electricity for domestic users and for lighting is recommended by the Electricity Committee for approval by the City Council and the Electricity Commissioners. Rentals of domestic apparatus and wiring are also to be increased by 25 per cent, and discount reduced from 5 to 2½ per cent. Industrial power rates are not affected.

Details of the proposed revisions are that the addition of 20 per cent on rates for lighting will be increased to 25 per cent. The secondary unit "charge" of ¼d. (plus 25 per cent for domestic use and any special agreements embodying a similar "unit" charge and not subject to a coal clause adjustment) will become 0·4d. plus 25 per cent; and the prepayment meter charge of ¼d. per kWh will be increased to ½d. The unit charge of ¾d. plus 25 per cent for heating, cooking, ventilating, accumulator-charging, and refrigeration, will become 1d. plus 25 per cent.

USE OF SIREN.—A siren warning will in future be given in Bradford of any impending electricity cut.

**Brighton.**—NEW SUBSTATIONS.—To meet increasing demands in the Coombe Road district it is proposed to provide a new substation and to change over a number of consumers from d.c. to a.c. The estimated cost, including the necessary h.v. feeder and l.v. distributor connections, is £5,439. A similar scheme in Old Shoreham Road will cost £16,891.

**Chester.**—FUTURE OF HYDRO-ELECTRIC PLANT.—At the December meeting of the City Council the chairman of the Electricity Committee reported that the hydro-electric plant "was barely paying its way" and might be scrapped if a proposal to build a large power station in the vicinity was adopted.

**Coventry.**—INCREASED CHARGES.—The City Council has confirmed a recommendation of the Electricity Committee that charges shall be increased by an average of 20 per cent as from the first readings of the meters after 31st March next. Alderman B. H. Gardner, chairman of the Electricity Committee, said the deficit for the first six months of the current year was £35,365, and might rise to £100,000. The reserve fund amounted to only £86,000. Coventry's electricity charges were lower than the average for other public authorities.

**Liverpool.**—CHARGES FOR COOKERS.—The Electricity Committee has approved increased charges for electric cookers as follows (existing charge in parentheses):—Standard type:—Hire of cooker and switch, 14s. 6d. (10s.) per quarter, and including wiring up to 50 ft., 16s. (11s. 6d); hire-purchase, excluding wiring, £1 5s. (£1) for 24 quarters; cash sale, excluding wiring, £28 10s. (£22 16s.); and maintenance only, 18s. (14s.) per annum. Kitchenette cooker:—Hire of cooker and switch, 11s. (7s. 6d.) per quarter, and with wiring up to 50 ft., 12s. 6d. (9s.); hire purchase, £1 (15s.) for 24 quarters; cash sale, excluding wiring, £22 16s. (£17 2s.).

**London.**—J.E.A. TARIFF REVISION.—The estimates of the London and Home Counties Joint Electricity Authority for 1948 anticipate a deficit on local distribution account. The Electricity Commissioners have intimated that they would find it difficult to accept as satisfactory a continuance of charges at existing levels in view of the present trend of costs, and point particularly to the uneconomic running charge of 0·55d. in the inner zone. The Finance Committee of the J.E.A. has recommended that, immediately after the reading of the meters for the March quarter, the "unit" charge of 0·55d. for supplies in the inner zone under the domestic, business and power two-part tariffs in the summer quarters shall be increased to 0·825d.

L.M.S. GENERATING STATION.—As a result of an arrangement between the L.M.S. Railway and the Central Electricity Board, the former's generating station at Stonebridge Park, Wembley, will shortly be connected to the grid system. The interconnection, which is being effected by a cable link between Stonebridge Park and the Willesden station of the London Power Co., will enable a mutual transfer of electricity between the company and the Board as circumstances may require. The L.M.S. will thus be able to utilize plant capacity not fully used during the part of the day which is off "traffic peaks" to augment the resources of the grid, and it will be able to obtain a supply from the grid if any of its own generating plant is out of commission. The station originally generated electricity at 25 c/s. Just before the war it was decided to reconstruct the station to generate at the standard frequency of 50 c/s and to modernize the power house equipment, rebuild the substations and bring them under remote control from the generating station.

**North-East England.**—VOLTAGE STANDARDIZATION.—The North-Eastern Electric Supply Co., Ltd., is to alter the voltage of a.c. supplies from 500 V, 460 V, 250 V and 230 V, single-phase and 440 V and 400 V three-phase to 480 V and 240 V single-phase and 415 V three-phase.

**Otley.**—EXPERIMENTAL LIGHTING PROHIBITED.—On the ground that the time is inopportune, the Ministry of Transport has refused to allow the Electrical Distribution of Yorkshire, Ltd.,

to install an experimental strip of fluorescent lighting in Kirkgate.

**Scotland.**—LOCH SLOY SCHEME DELAYS.—Difficulties have been experienced over labour and materials for the North of Scotland Hydro-Electric Board's Loch Sloy power scheme. The probable date when power will be supplied from the scheme is now given by the chairman of the Board (Mr. Thomas Johnston) as towards the end of 1949. One of the main difficulties encountered is in connection with the tunnelling through Ben Vorlich. Erection is almost completed of an electrically driven conveyor belt which will handle 1,500 tons of crushed rock daily.

**Sunderland.**—DOCK LIGHTING IMPROVEMENTS.—The River Wear Commissioners are to spend £592 on sodium lighting for the east and south side of Hendon Dock.

**Stoke Newington.**—INSTALLATION OF COOKERS.—The results of a canvass of tenants of flats on the Hawksley Court estate show that of 48 interviewed, 13 have gas cookers which are their own property, 33 are having electric cookers installed (nine already use electricity for cooking) and the remaining two prefer gas cookers.

**Swansea.**—EXTENSIONS.—The Electricity Department is to lay an additional main from Manselton to Cadle (£8,433), provide a new substation (£4,387) and new switchgear at the Mannesmann Corner substation (£2,160).

**Workington.**—SUPPLY TO TRADING ESTATE.—The Electricity Committee is making application for sanction to borrow £10,500 for supplying electricity to the Salterbeck Trading Estate, and £8,900 for extending the 11-kV cable system between Salterbeck, Laverock Hall and Annie Pit substations.

**Usk.**—STREET LIGHTING.—Consideration is being given to the question of converting the street lighting from gas to electricity.

**Yorkshire.** — REBATES CONFIRMED. — The Ministry of Fuel and Power has approved the proposed rebates to consumers by undertakings benefiting under the Ilkley award. It only remains for the Yorkshire Electric Power Co. to make the payments to the twenty-three authorities concerned. The Ilkley Council made a refund to consumers and concessions have also recently been announced at Brighouse, Heckmondwike and Skipton. Other authorities to benefit include Pudsey Corporation, which has announced that it intends to allow a 50 per cent discount on consumers' December accounts, and Dewsbury, which is reducing the charges for the current and next quarters by 10 per cent.

## Overseas

**New Zealand.**—CLUTHA RIVER SCHEME.—The hydro-electric development of the Clutha River in Central Otago, South Island, is estimated to cost £8,500,000 initially. Eight generators will produce nearly 500,000 h.p.

# Municipal Reports

**Bromley.**—The highest rate of increase in sales since 1936 is recorded by the borough electrical engineer (Mr. W. G. Trend) in his report for 1946-47. Total consumption rose by 24·5 per cent to 27·8 million kWh, equal to 525 kWh per head of the population. Revenue at £205,748 was up by £39,965 and there was a gross profit of £43,452 (against £34,717), the net result being a surplus of £5,301 against a deficit of £7,206 in 1945-46. Revenue per kWh sold amounted to 1·66d. (1·64d.).

**Salford.**—Mr. L. Romero retired from the position of city electrical engineer and manager last April and the report for 1946-47 is signed by his successor, Mr. E. S. Booth. It records an increase of 16 million kWh (11·6 per cent) in sales, which, excluding bulk supplies, aggregated 154·6 million kWh. The additional consumption was primarily under the domestic "all-in" rate. The overall average price obtained per kWh sold was 1·09d. compared with 1·119d. in the previous year and 0·954d. in 1938-39. The accounts show a loss of £19,145 (against a profit of £23,320 in 1945-46) after bringing in £39,018 over-provision for payments to C.E.B. in respect of the years 1940-45. Income amounted to £731,903 (£59,510 increase) while working expenses, after allowing for the £39,018 credit, totalled £644,624 (£110,611 increase). Details are given of the progress with the new Agecroft station which was scheduled for completion by September next, but is unlikely to be in commission before early 1950.

**Southampton.**—Provisional accounts for 1946-47 show a net surplus of £24,473 (against £33,880 in the previous year) after meeting special expenditure of £31,212. Income rose by £77,684 to £805,647 and working expenses by £78,019 to £675,836. Average revenue per kWh sold amounted to 1·165d. (1·185d.). A sum of £13,000 was contributed to the rates, making £141,600 to date. Excluding bulk supplies of 20 million kWh the undertaking last year sold 132·2 million kWh—15 million (13 per cent) more than in 1945-46. The output of the generating station totalled 169·2 million kWh, an increase of 30 per cent. An additional 2,435 consumers were connected, making 58,040 in all; this figure compares with 59,349 in June, 1940, before the raids on the town. Despite limited supplies, 1,763 domestic electrical appliances were sold during the past year under the seven years' hire-purchase scheme, and 705 wiring installations required in connection with the scheme were carried out by direct labour. The undertaking, of which Mr. W. G. Turner is borough electrical engineer, celebrated its jubilee on 27th April, 1946.

# FINANCIAL SECTION

## Company News. Stock Exchange Activities.

### Reports and Dividends

**The Brush Electrical Engineering Co., Ltd.**—At the annual general meeting held on 23rd December Sir Ronald Matthews (chairman) said that since the issue of the report and accounts, interim accounts for periods 11 and 12 of 1947 disclosed a profit of over £100,000 bringing the aggregate profit to the end of November, 1947, to something in excess of £300,000. The company had been fortunate in the last two years in being able to supplement this turnover in its own products and so satisfy customers, who otherwise would have been given longer delivery dates, and to add to its gross profits by the purchase or re-purchase, reconditioning and sale of wartime produced equipment, mainly of its own manufacture. This added £66,000 to the gross profits subject to overheads, in the period to 5th October, but while further profits of this nature were still being earned, they were no longer significant in relation to the earnings on the company's own manufacturing activities.

**Holophane, Ltd.**—At the annual meeting last week, Mr. H. Guy Campbell, who presided, said that work was in progress on repairing war damage to their premises, and improvements to the laboratories, demonstration and showrooms, workshops and offices. The value of orders outstanding on the books had substantially increased since the previous year, but although there had been some improvement, shortage of materials still restricted their activities. Export business had grown and every effort was being made to expand it still further.

**Engineering & Lighting Equipment Co., Ltd.**—In his statement submitted at the annual meeting, Mr. S. A. Marples (chairman) said that a considerable amount of development work had been carried out on lighting fittings in order to use material more readily available, and it was anticipated that the results of this would be seen in the present year. Attention had been directed to the expansion of their export markets and satisfactory arrangements had been completed in a large number of countries from which increasing orders were being obtained.

**Aeronautical & General Instruments, Ltd.,** reports a profit, before taxation, for the year ended 31st March last of £35,929, after crediting substantial sums attributable to the final settlement of certain Government contracts. For 1945-46 the profit was £45,100. It is proposed to pay a final dividend of 9 per cent (against 10 per cent) making 16 per cent (16¼ per cent) for the year.

**British Rola, Ltd.**—The company's annual meeting was held on 19th December, Mr. C. R. Andersen presiding. The chairman, in his statement, said that they were taking steps to extend the export market for their loudspeakers and were negotiating with overseas agents for local assembly of their speakers in countries where there was sufficient demand. Arrangements had been made for the manufacture and assembly of other articles to keep their plant fully occupied when the demand for speakers decreased to normal. Certain difficulties had been encountered owing to controls, but it was hoped that these would not be a permanent handicap.

**The Decca Record Co., Ltd.,** in its accounts for the year to 31st March last, reports a profit of £127,609 (including £30,292 over-provision for taxation in previous years, and about £10,000 profit on war contracts). This compares with £95,478 in 1945-46 (including £51,000 E.P.T. recoverable). To last year's figure is added a profit of £41,067 on the sale of shares in Decca Records Inc. The ordinary distribution for the year is maintained at 112½ per cent with a final dividend of 79½ per cent.

### New Companies

**Philips Electrical Industries, Ltd.**—Private company. Registered 19th December. Capital, £2,500,000. To acquire not less than 90 per cent of the issued share capitals of Philips Electrical, Ltd., London Carriers, Ltd., and Radio Equipment, Ltd., and to carry on the business of manufacturers, importers and exporters of, and dealers in or agents for, radio valves and apparatus, electric lamps, discharge tubes, signs, etc. Directors: S. S. Eriks, J. F. van den Laan (directors of Philips Electrical, Ltd.), Hon. G. A. Akers-Douglas, and J. Venning. Regd. office: Spencer House, South Place, E.C.2.

**R. D. Latham, Ltd.**—Registered 1st December. Capital, £2,000. Electrical, radio, television, lighting, telephone, mechanical and general engineers, etc. Directors: K. H. Mackay, R. D. Latham and P. A. Akehurst. Regd. office: 7, Courthouse Street, Hastings.

**Constable, Ohlson & Broad, Ltd.**—Registered 28th November. Capital, £6,000. Factors, manufacturers and repairers of, and dealers in, electrical goods, etc. Directors: W. H. Browning, R. W. Browning and C. A. Bartlett. Regd. office: 16, Surrey Lane, Battersea, S.W.11.

**Lewker Products, Ltd.** — Registered 25th November. Capital, £1,000. Designers, manufacturers and dealers in electrical and radio apparatus, etc. Permanent directors: T. F. Lewis and J. C. Walker. Regd. office: 68, Deodar Road, Putney, S.W.15.

**Tubelight Lamp Co., Ltd.**—Registered 19th December. Capital, £2,000. Wholesale and retail merchants and manufacturers of, and

dealers in, electrical goods, including general electrical and radio fittings, etc. Directors: E. Bird and Mary C. Bird. Regd. office: 6-8, Grosvenor Street, Manchester, 1.

**J. Otley Rhodes, Ltd.** — Registered 16th December. Capital, £20,000. To acquire the business of electrical engineers and dealers in photographic supplies, X-ray and electro-medical apparatus carried on by J. C. Rhodes and E. A. Rhodes at Newport, Mon. Directors: J. O. Rhodes and Mrs. E. A. Rhodes. Regd. office: Arcade Chambers, High Street, Newport, Mon.

**Electrosphere, Ltd.**—Private company. Registered 17th December. Capital, £1,000. Manufacturers of, and dealers in, electrical and electronic instruments, apparatus and accessories, etc. Subscribers: P. A. Bligh and C. G. Willson-Pepper. Regd. office: 341, Finchley Road, N.W.3.

**Morrisflex, Ltd.**—Registered 25th November. Capital, £1,000. Electrical, mechanical, motor and general engineers, etc. Permanent directors: E. M. Morris and Mrs. F. Morris. Secretary: W. O. Rydings. Regd. office: Tythe Barn Lane, Shirley, Birmingham.

**Radiac (Exports), Ltd.** — Registered 4th December. Capital, £300. Manufacturers, importers, exporters and repairers of, and dealers in, dynamos, motors, batteries, etc. Directors: S. F. Peel, H. Lytton and C. E. Bentley-Stevens. Regd. office: 1-3, Walkers Court, W.1.

**Crater Products, Ltd.**—Registered 2nd December. Capital, £600. Manufacturers of, agents for, and dealers in, electrical plant, artificial lighting apparatus, wireless sets, etc. Directors: A. L. Craven, G. Jater and D. C. Phipps. Regd. office: St. Johns Lye, St. Johns, Woking.

**North Herts Electrical Installations, Ltd.**—Registered 6th December. Capital, £2,000. Directors: W. J. Claydon, G. J. Morley and G. H. Nott. Regd. office: 5, Leys Avenue, Letchworth.

**Electrical Fitting Co., Ltd.** — Registered 5th December. Capital, £5,000. Electrical engineers, electrical wiring and installation contractors, etc. Directors: R. H. Rabjohns (managing director) and J. T. Meadlarklan. Regd. office: 91, Hamilton Road, Felixstowe.

**Philson Manufacturing Co., Ltd.**—Registered 15th December. Capital, £2,000. Wireless, television, electrical, electronic and general engineers, etc. Directors: V. C. Phillips and J. M. W. Swanson. Regd. office: 378, Scotswood Road, Newcastle-on-Tyne.

**Mansfield Factors (Electrical Supplies), Ltd.**—Registered 12th December. Capital, £5,000. Directors: R. Lowe, Lawrence Lowe, Leslie Lowe and Leonard Lowe. Regd. office: 55a, Belvedere Street, Mansfield, Notts.

**Freezair, Ltd.**—Registered 10th December. Capital, £1,000. Manufacturers of, and dealers in, electrical and electronic instruments, apparatus and accessories of all descriptions used for heat, light, freezing, refrigeration, telegraphy, telephony, radio and television, etc. Subscribers: O. Bates and F. W. S. Osborne. Regd. office: 24, Portland Place, W.1.

**A. G. West, Ltd.**—Registered in Edinburgh 9th December. Capital, £2,000. Electricians, etc. Subscribers: W. A. Acton and J. Stewart. Regd. office: 33a, Gordon Street, Glasgow.

**Grosvenor Electrical Co. (Belgravia, London), Ltd.**—Registered 11th December. Capital, £2,000. Directors: A. J. Turner, L. C. Turner and W. J. Cross. Regd. office: 12, Eccleston Street, Victoria, S.W.1.

**Butler, Mabey & Co., Ltd.**—Registered 12th December. Capital, £1,000. Manufacturers of, and dealers in, electrical and electronic instruments, apparatus and accessories, etc. Victor L. J. Comyn signs as director. Regd. office: 341, Finchley Road, N.W.3.

**Barrie Electric, Ltd.**—Registered 12th December. Capital, £500. Electrical engineers, consultants and contractors, etc. Directors: B. Alton and E. Alton. Regd. office: 116, Carlton Avenue West, North Wembley.

## Increase of Capital

**Philips Balham Works, Ltd.**—Capital increased by £175,000 in £1 "A" shares, beyond the registered capital of £25,000. At 30th January, 1947, Mullard Wireless Service Co., Ltd., held 14,999 "A" shares and 10,000 "B" shares of £1. The 175,000 new "A" shares were allotted to Midland Bank Executor & Trustee Co., Ltd., on 2nd December, 1947.

## Liquidations

**Kent & Sussex Refrigeration Co. (Northfleet), Ltd.**, 177, High Street, Northfleet, Kent.—At the first meetings of the creditors and shareholders held at the offices of the Board of Trade, Columbia House, Aldwych, London, W.C., a resolution was passed for the appointment of Mr. C. L. Walker of Thornton Walker & Co., 23a, St. James' Street, London, S.W.1, as liquidator.

**Robdor Radio & Electrical Appliances, Ltd.**—Winding up voluntarily. Liquidator, Mr. P. Phillips, 76, New Cavendish Street, London, W.1. A declaration of solvency has been lodged with the Registrar of Companies.

**Acton Electric Tools, Ltd.**—Meeting of members on 26th January, 1948, at 2, Surrey Street, London, W.C.2, to receive an account of the winding-up by the liquidator, Mr. T. Lister. (Members' voluntary winding-up.)

## Bankruptcies

**A. Fielding**, electrician, 223, Whalley New Road, Blackburn, Lancs.—Discharge granted subject to judgment for £20.

**R. T. Morrison**, electrical engineering contractor, 82, Lumb Lane, Bradford.—Discharge granted subject to a suspension of one month.

# STOCKS AND SHARES

THE past year has been one of violent fluctuations in Stock Exchange prices, accompanied by substantial volume of business. Most markets round the House have had their turn of activity, with nationalization playing no small part in the price changes which have occurred. The year opened well from the point of view of the shareholder, and rising prices continued for several weeks. In spite of a fairly general feeling that quotations were approaching abnormally high levels, the demand for stock persisted, with the result that what may be called gilt-edged ordinary shares rose, almost monotonously, day by day. Good class preference reached a record height; in debentures and debenture stocks something like famine prevailed.

### Switchback Markets

There was a sharp reaction later on, and prices fell away as rapidly as they had advanced. In the middle of the year, markets assumed an aspect bordering on depression. It has been a year of considerable ups and downs, and study of the fluctuations that have occurred over the period January—December, are of more interest than usual. Here, to start with, is a table showing the changes which have occurred in the prices of ordinary shares in the London electricity supply companies—

| Ordinary | 31st Dec., 1946 | Now | Rise or Fall |
|---|---|---|---|
| City of London .. | 34/– | 33/– | −1/– |
| County of London .. | 46/6 | 47/6 | +1/– |
| London Assoc. Elec. | 27/– | 28/– | +1/– |
| Metropolitan .. | 46/3 | 45/6 | −9d. |
| Northmet Power .. | 43/9 | 45/– | +1/4 |
| South London .. | 33/– | 30/6 | −1/2 |

### Electricity Supply

Prices of the ordinary shares in the Provincial and Scottish electricity supply companies have remained so steady that for week after week no quotable changes occurred in the official Stock Exchange daily lists. On the year, the changes are comparatively slight, as the following representative group shows :—

| Ordinary | 31st Dec., 1946 | Now | Rise or Fall |
|---|---|---|---|
| Bournemouth & Poole | 65/6 | 63/– | −2/6 |
| Clyde Valley .. | 44/– | 44/– | — |
| Edmundsons .. .. | 29/6 | 30/6 | −1/– |
| Elec. Dis. Yorks. .. | 48/6 | 48/6 | — |
| Lancs. Light & Power | 34/6 | 36/– | +1/6 |
| Midland Counties .. | 49/– | 49/6 | +6d. |
| Midland Elec. Power | 47/– | 44/6 | −2/6 |
| North Eastern .. | 32/– | 34/6 | +2/6 |
| Northampton .. | 51/– | 48/– | −3/– |
| Scottish Power .. | 43/– | 44/– | +1/– |
| Yorks. Electric .. | 47/6 | 48/6 | +1/– |

### Manufacturing and Equipment

The electrical manufacturing and equipment group has been through a trying time for the nerves of holders of shares in most of the companies connected with the industry. Last February, high levels were touched as capital poured into industrial investments in most Stock Exchange departments. Warnings from the Government as to the undesirability of dividends being increased, were followed by a spate of advanced distributions. Expansion of the profit element is a noteworthy feature of many accounts in the year under review. How unfavourably the various cross-currents have affected prices in this section the following representative table illustrates:—

| Ordinary | 31st Dec. 1946 | | Rise or Fall |
|---|---|---|---|
| Assoc. Elec. Ind. .. | 74/– | 85/– | +11/– |
| British Ins. Callender's | 46/6 | 40/– | −6/6 |
| Crompton Parkinson (5/–) .. .. | 32/– | 30/6 | −1/6 |
| English Electric .. | 66/6 | 54/6 | −12/– |
| Ever Ready (5/–) .. | 50/– | 38/6 | −11/6 |
| General Electric .. | 102/– | 92/6 | − 9/6 |
| Henley's (5/–) .. | 28/6 | 26/– | −2/6 |
| Johnson & Phillips .. | 85/6 | 76/3 | −9/3 |
| Siemens .. .. | 38/– | 32/6 | −5/6 |

Extending the list to cover a wider area, here is a further table of ordinary shares in companies connected directly or indirectly with the electrical industry. Depreciation has been substantial:—

| Ordinary | 31st Dec., 1946 | Now | Fall |
|---|---|---|---|
| Automatic Tel. & El. | 76/3 | 67/6 | 8/9 |
| Cossor, A.C. (5/–) .. | 28/– | 17/6 | 10/6 |
| Crabtree (10/–) | 48/– | 44/6 | 3/6 |
| Elec. & Musical (10/–) | 26/– | 18/9 | 7/3 |
| Elec. Constrn. .. | 65/– | 45/– | 20/– |
| Enfield Cable .. | 53/6 | 37/6 | 16/– |
| Ericsson (5/–) .. | 55/– | 45/– | 10/– |
| Lancs. Dynamo .. | 6 | 5½ | 5/– |
| Mather & Platt .. | 58/3 | 55/– | 3/3 |
| Reyrolle .. .. | 80/– | 68/3 | 11/9 |
| Westinghouse Brake | 79/– | 71/3 | 7/9 |

### Cable Stocks

Cable & Wireless ordinary stock has experienced a very considerable rise over the twelve-month due to the expectation of the manner in which the stock will emerge when the nationalization scheme comes into force. The stock has been one of the principle centres of speculation. Apart from this, business in this group has come spasmodically.

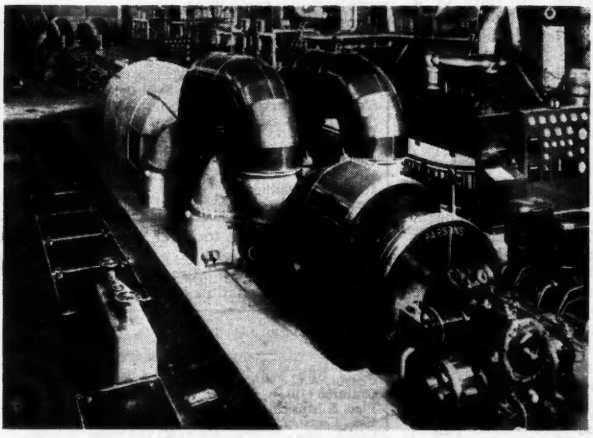
| Stock or Share | 31st Dec., 1946 | Now | Rise or Fall |
|---|---|---|---|
| Anglo-Amer. pref. .. | 148½ | 130 | −18½ |
| Cable & Wireless pref. | 122 | 121½ | −½ |
| Ditto. ord. .. .. | 119½ | 177½ | +58 |
| Great Northern .. | 38 | 27½ | −10½ |
| Marconi Marine .. | 33/6 | 32/6 | −1/– |

It is always dangerous to prophesy, and particularly so in Stock Exchange matters, but so far as can be seen from the immediate condition of affairs, the Government's policy of cheap money appears likely to exercise a further stimulating effect upon prices of industrial stocks and shares. It is at any rate sufficiently encouraging to permit the expression of the sincere wish that 1948 may prove a prosperous year, both nationally and individually.

# Manufacturing Progress

## Important Export Orders Carried Out

NEARLY 2·5 million kW of turbo-alternators is on order from or under construction by **C. A. Parsons & Co., Ltd.** Three-cylinder 3,000-r.p.m. machines for this country include two of 50,000 kW for Poole (Bournemouth & Poole Co.), a fourth for Braehead (Glasgow), two for Nechells (Birmingham), two more 60,000-kW sets for Skelton (Leeds), three for Keadby, Lincoln (C.E.B.), and four for Littlebrook (Kent Power Co.). Steam conditions for the 60,000-kW size are 900 lb per sq in. (63·27 kg per cm²) and 925 deg F (496 deg C) with five-stage feed-water heating up to 385 deg F (196 deg C); some of the alternators are to be hydrogen-cooled. A second 31,500-kW turbo-alternator for Ballylumford power station is also in hand. For industrial power stations several condensing and pass-out units of from 1,500 to 6,500 kW are under construction.

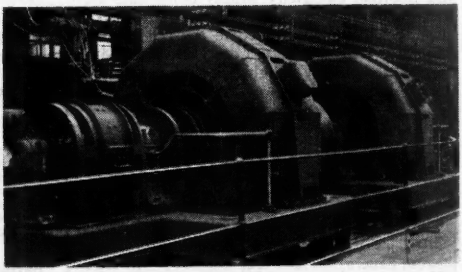


**The third 40,000-kW Parsons set at the Earley (Reading) station went into operation last year**

Orders for Australia cover a 50,000-kW, 3,000-r.p.m. turbo-alternator (33 kV) for White Bay (Sydney), two similar sets for Yallourn (Victoria), one of 30,000 kW for Osborne "B" (Adelaide) and one of 15,000 kW for Brisbane. A 20,000-kW set for Regina is the largest required for Canada, and three of 4,000 kW are among many for India. A second 20,000-kW set for Klang, Malay Peninsula, and one of 15,000 kW for Mexico are others.

Turbo-alternators put into commercial operation include the third 40,000-kW (33-kV) unit at Earley power station (C.E.B.), a fourth of 53,500 kW at Hams Hall "B" (Birmingham) and one of 22,500 kW at Valley Road (Bradford). In Australia 30,000-kW two-cylinder tandem sets were started up at Newport "C" (Melbourne) and Osborne "B" (Adelaide), and in Canada and India ratings up to 15,000 kW.

Hydro-electric plant is a feature of recent contracts awarded to **Bruce Peebles & Co., Ltd.** An example is the complete equipment for Loch Luichart power station, including two Francis turbines coupled to 10,000-kW vertical-shaft alternators—a duplicate of the machinery now under construction for Grudie Bridge station of the Loch Fannich scheme. The demand for motors for all purposes is very large, among them being a 2,050-h.p. 2,975-r.p.m. squirrel-cage motor for direct-on-line starting a boiler-feed pump.



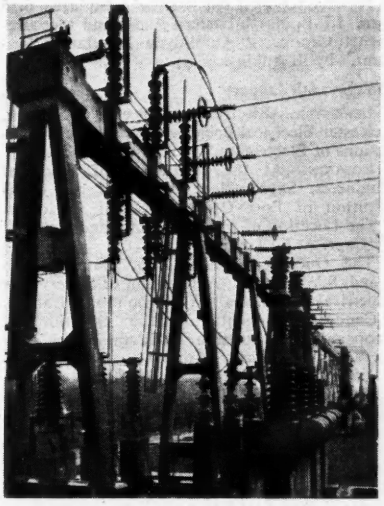
**Back-to-back tests on 700-b.h.p. synchronous induction motors for Gold Coast gold mine**

Export orders include a 15,000-kVA synchronous condenser for New Zealand, a 4,700-kVA hydro-electric alternator for Columbia, four 1,500-kW motor convertors for Calcutta and many alternators up to 5,300 kVA for various Dominions and foreign countries, for which thousands of horse-power of motors are also under construction. The latter include 900-h.p. slow-speed induction motors for Australia, 950-h.p. synchronous motors for Borneo, 700-h.p. synchronous-induction motors for West Africa, over 1,600 h.p. for oilfields and several more for Malayan tin mines.

The number of large transformers in course of manufacture exceeds previous records of the company and includes twenty-four units totalling 800,000 kVA. Among these are an additional 75,000-kVA, 33-kV generator transformer for Edinburgh, three 30,000-kVA, 132-kV units for the Central Electricity Board, twelve of 132 kV and 33 kV with an aggregate capacity of 280,000 kVA for the North of Scotland Hydro-Electric Board and numerous others up to 15,000 kVA for electricity supply undertakings. Most of these will have automatic voltage regulation with self-cooling at lower outputs and temperature-controlled forced cooling at higher loadings. In addition to substantial orders from the Dominions, the home market has called for large numbers of distribution and mining-type transformers, many of the latter being the mobile-substation type with flameproof switchgear. Among orders for mercury-arc rectifiers are several for charging batteries for mine cars underground for British and Canadian mines.

Following the commissioning of outdoor 2,500-MVA air-break circuit breakers at one power station in Great Britain, orders have been received for other installations by **A. Reyrolle & Co., Ltd.** Open-type indoor switchgear is being made with isolators having rotating bushings, and 66-kV air-blast and 132-kV small-oil-volume units are in hand for power stations, while the demand for 66- and 33-kV units of the last-named kind has been steady. Metal-clad switchgear is being built for 33-kV distribution with ratings of from 500 to 1,000 MVA. A new development is a 33-kV 500-MVA outdoor single-break unit with frame-mounted tank.

Post-war improvements in standard sub-station switchgear, for which the demand is unprecedented, include turbulators and handling facilities. Installations of high- and medium-voltage metal-clad switchgear and medium-voltage switch-fuses have been completed for Government laboratories, and metal-clad switchgear of from 75 to 500 MVA has been applied to stand-by generating plants. Substantial orders are also being executed for 3·3-kV and 400-V air-break switchgear for power station auxiliaries and substations, and a range of flameproof switch-and-fuse distribution gear is being developed.



**Air-blast 2,500-MVA circuit breaker for 132 kV**

An increasing volume of orders from the Dominions is reported, notably from Canada, New Zealand, Australia, India and South Africa, and also from Central and South America, China, Malaya, Western European countries and (for coal-mining switchgear) the U.S.S.R. Rotating machinery, principally a.c. variable-speed commutator motors and d.c. arc-welding equipment, is said to be in great demand by home and foreign buyers.

## New E.M.I. Factory

Electric & Musical Industries, Ltd., has arranged to purchase a modern factory at Perivale from Radio & Television Trust, Ltd. Products made at this factory by the present owners are being transferred to other factories in their group and elsewhere. The main factory of the E.M.I. group is at Hayes, some three miles distant. The group also has a factory at Treorchy in South Wales. These three establishments will be operated largely for extension of the group's export trade.

# Next Week's Events

**Monday, 5th January**

BIRMINGHAM.—James Watt Institute, 6 p.m. I.E.E. South Midland Centre. "Comparison between Gas and Electricity on the basis of Coal Economy," by P. Schiller.

LIVERPOOL.—Royal Institution, Colquitt Street, 6.30 p.m. I.E.E. Mersey and North Wales Centre. "Electric Traction on the Southern Railway," by C. M. Cock.

NEWCASTLE-ON-TYNE.—King's College, 6.15 p.m. I.E.E. North-Eastern Radio and Measurements Group. "Amplidyne Regulating Systems," by B. Adkins.

**Tuesday, 6th January**

LEICESTER.—Electricity Offices, 6.45 p.m. Leicester Electrical Society. "Industrial Applications of Electronics," by Dr. W. Wilson.

LONDON.—At the Institution of Electrical Engineers, Savoy Place, W.C.2, 5 p.m. Institution of Post Office Electrical Engineers. "The Location of Faults in Lines and Cables," by Capt. A. C. Timmis.

The Oddfellows' Hall, 186, Hammersmith Road, S.W., 7 p.m. Association of Supervising Electrical Engineers (West London Branch). "Candid Comments on the Question of Propaganda in relation to Illuminations," by G. V. Downer.

LUTON.—Technical College, Park Square, 7.30 p.m. Luton Electrical Society. Informal meeting. "Electrical Plant Breakdowns in Industry," by L. E. Tremayne.

MANCHESTER.—Engineers' Club, Albert Square, 6 p.m. I.E.E. North-Western Centre. Report on "The Practical Training of Professional Electrical Engineers," to be presented by D. B. Hoseason.

**Wednesday, 7th January**

ABERDEEN.—Caledonian Hotel, 7.30 p.m. I.E.E. North-East Scotland Sub-Centre. "The Design of High-Fidelity Disc Recording Equipment," by H. Davies.

CARDIFF.—Corporation Demonstration Theatre, 6.30 p.m. Illuminating Engineering Society (Cardiff Centre). Presidential Address by Dr. J. W. T. Walsh.

MANCHESTER.—College of Technology, 6 p.m. Illuminating Engineering Society (Manchester Branch). "The Lighting of Housing Estates," by E. J. Stewart. Joint meeting with the Association of Public Lighting Engineers.

MIDDLESBROUGH.—Cleveland Scientific and Technical Institute, 6 p.m. I.E.E. Tees-Side Sub-Centre. "Some Observations on Oil Deterioration in Transformers and Switchgear," by H. Hurworth.

SOUTHSEA.—Council Chambers. I.E.E. Southern Centre. "Neutral Earthing of Three-Phase Systems with particular reference to Large Power Stations," by J. R. Mortlock and C. M. Dobson.

**Thursday, 8th January**

DUNDEE.—Royal Hotel, Union Street, 7 p.m. I.E.E. North-East Scotland Sub-Centre. Paper by H. Davies.

SWANSEA.—Guildhall, 6 p.m. I.E.E. West Wales (Swansea) Sub-Centre. "Electrical Control of Dangerous Machinery and Processes," by W. Fordham Cooper.

**Friday, 9th January**

LONDON.—Caxton Hall, Westminster, S.W.1, 6.30 p.m. E.P.E.A. (Southern Meter Engineers' Group). "Criticisms of the Design and Development of the Two-part Tariff Meter," by W. A. Devon.

MANCHESTER.—College of Technology, 7.30 p.m. Manchester Association of Engineers. "Researches now in Progress in the Cavendish Laboratory," by Prof. Sir Lawrence Bragg.

**Saturday, 10th January**

BIRMINGHAM.—Grand Hotel, 3 p.m. Birmingham Electric Club. Children's Party.

## Electricity and Coal Economy

THE Coal Utilization Sub-Committee of the Parliamentary and Scientific Committee has submitted a further interim report to the Minister for Economic Affairs and the Minister of Fuel and Power which deals with considerations affecting the solid fuel combustion appliance industry, the gas industry and the electricity industry.

As regards the last-named the report says that the priorities already accorded to generating, transmission and distributing plant should safeguard to a great extent the immediate contribution to coal economy by the electrical industry. Even when the need for load shedding through inadequate power sources has been overcome, however, there will still be room for improvement in the efficient utilization of electric power. There is, for instance, need to achieve a level of plant adequate to eliminate excessive variation of voltage and frequency. Again, throughout industry there is much waste through inability to obtain electric motors of the right size for the job. The same applies to control gear, since close control in intermittent processes can produce substantial savings.

It should also be realised that auxiliary electrical equipment, particularly motors, is essential to a great deal of the plant mentioned earlier in the report, and everything should be done to speed up the output of such equipment. Most of the other ways—e.g., in the domestic field—in which the electrical industry can contribute to coal saving are (in so far as they are not already covered by existing priorities and instructions) of a longer-term nature, and can be better dealt with in the final report.

# CONTRACT INFORMATION

## Accepted Tenders and Prospective Electrical Work

## Contracts Open

*Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.*

**Barking.**—9th January. Electricity Department. Stoneware conduits, troughs and covers, and interlocking cable covers. (26th December.)

**Blackpool.**—12th January. Town Council. Electrically driven automatic centrifugal pump, with accessories. Borough surveyor, Municipal Buildings.

**Camberwell.**—12th January. Borough Councill. Electric lamps for twelve months from 1st April. Borough engineer, Town Hall.

**Dagenham.**—10th January. Town Council. Lamps and other electrical supplies for the year commencing 1st April, 1948. Borough engineer, Civic Centre.

**Kettering.**—30th January. Electricity Department. Two 11-kV, 3-phase, 250,000-kVA, duplicate busbar, metalclad switch units. (26th December.)

**New Zealand.**—2nd March. 10-ton electric overhead travelling crane for Maratai power station (Contract 69) and 220-kV air-break switchgear for Bunnythorpe and Haywards substation (Contract 70). N.Z. Trade Commissioner, Melbourne.

**Southend-on-Sea.**—30th January. Corporation. 33/11-kV transformer, 33-kV indoor switchgear, and 33-kV and 66-kV cables. (See this issue.)

**Stockport.**—9th February. Electricity Department. Supply and erection of storage battery at Millgate generating station. (19th December.)

**Wandsworth.**—21st January. Borough Council. Fluorescent lighting in Rates Hall, Municipal Buildings. (See this issue.)

**Woolwich.**—25th February. Electricity Department. Four voltage regulators, two mercury arc rectifiers and two outdoor transformers. (See this issue.)

## Orders Placed

**Farnworth.**—Electricity Committee. Recommended. 500-kVA steel substation kiosk (£808) and 11-kV switchgear (£367).—Crompton Parkinson. One 500-kVA transformer (£607).—Foster Transformers & Switchgear. One 500-kVA transformer (£607).—Ferranti. Overground pillar boxes and underground boxes (£824).—W. T. Henley's Telegraph Works Co. Meters (£1,246).—Aron Electricity Meter.

**Ilford.**—Corporation. Accepted. Three 500-kVA 6,600/433-V distribution transformers (£2,096).—British Electric Transformer Co. Three similar transformers (£2,102).—Ferranti.

## Contracts in Prospect

*Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.*

*It must be borne in mind that many of the projects mentioned may be postponed as a result of the Government's suspension of building activities for the time being.*

**Amble.**—Houses (30), Links estate, for the U.D.C.; G. Bainbridge, builder, Westgate Road, Newcastle-on-Tyne.

**Astley.**—Primary school, Marsland Green; G. Noel Hill, county architect, County Offices, Preston.

**Aylesbury.**—Three pavilions at Manor House, for Bucks County Mental Deficiency Committee (£16,180); F. A. C. Maunder, county architect.

**Ayrshire.**—Houses (500); county architect, County Council, Ayr.

**Beccles.**—Maternity block at Beccles and District War Memorial Hospital (£53,000); East Suffolk Public Health Committee.

**Biggleswade.**—Grammar school, Hitchmead Road; S. C. Jury, Shire Hall, Bedford.

**Bolton.**—Extensions to works, High Street; Wm. Wadsworth & Sons, Ltd.

Offices, Bromley Cross, for Ministry of National Insurance; J. H. Bullough (Contractors), Ltd., Gordon Street, Chorley.

**Bonnyrigg and Lasswade.**—District heating scheme for T.C.; G. L. Walls, architect, 45, Hanover Street, Edinburgh.

**Bradford.**—Civic restaurants and kitchens at Great Cross Street and Usher Street; borough engineer.

**Brighouse.**—Houses (50), Cain Lane housing estate, for T.C.; Spooner, Ltd., builders, Hull.

**Camberwell.**—Houses and flats (120), Denmark Hill estate, for B.C.; F. S. Palling, 124, Sloane Street, S.W.1.

**Cardiff.**—Extensions to Llandough Hospital; Sir Percy Thomas & Son, 10, Cathedral Road.

Extensions to foundry; Nevill Tubes, Ltd., Canal Parade.

Houses (32), Rumney, for Haig Homes; L. C. Powell, Norfolk House, Station Road, Chesham, Bucks.

**Carlisle.**—Junior and infants' school, Stanwix; P. Dalton, city engineer, 18, Fisher Street.

**Chesterfield.**—Hospital buildings, Ashgate, for Chesterfield Royal Hospital Board; A. Saxon Snell & Rees Phillips, architects, 9, Bentinck Street, London, W.1.

**Gateshead.**—Houses (33), Avon Street, Teviot Street, Highcliffe Gardens and Highfield Road; H. J. Cooke, chief architect, Municipal Buildings, Swinburne Street.

**Gloucester.**—Houses (40), Alkerton, Eastington; C. D. Carus-Wilson, architect to R.D.C., Hardwicke, Glos.

**Hammersmith.**—Three-storey building, Riverside Studios, Crisp Road; C. Edmund Wilford, architect, 109, Jermyn Street, S.W.1.

**Islington.**—Factory premises; L. & D. Redman, Ltd., 25, Corsham Street, N.1.

**Liverpool.**—First section of Olive Mount secondary school, Wavertree, for E.C.; city architect, Blackburn Chambers, Dale Street.

Industrial buildings, Speke Boulevard; Unit Construction Co., Ltd., Bentham Drive.

**Loughton.**—Secondary school, Border Lane (£100,000); county architect, Chelmsford.

**Machynlleth.**—Houses (62), Cae Crwn site, for U.D.C.; J. Brian Cooper, architect, 177, Corporation Street, Birmingham, 4.

**Millwall.**—Rebuilding refinery for Geo. Clark & Son, Ltd., Broadway Works; Wates, Ltd., 1258, London Road, S.W.16.

**Milnthorpe.**—Pasteurization plant at dairy; Libby, McNeill & Libby, Ltd.

**Minehead.**—Branch factory (£14,000); C. & J. Clark, shoe manufacturers, Bridgwater.

**Newcastle-on-Tyne.**—Extensions to the Royal Victoria Infirmary; W. Curtis Green, Son & Lloyd, 5, Pickering Place, St. James Street, London, S.W.

Offices for Walkers, Parker & Co., lead manufacturers, Skinnerburn Road.

**Newport (Isle of Wight).**—Engineering block for Technical College, Hunnyhill; S. Gregson, County Hall, Newport, I.O.W.

**Newport (Mon.).**—Bus station, Dock Street (£22,821); borough engineer.

**Reading.**—Workshops, offices, etc., Great Knolleys Street; John Wilder, Ltd., engineers, Cattle Market.

**Salford.**—Extensions to works, Gordon Street, for M. Stone, Ltd.; L. D. Clegg, architect, 5, Queen Street, Oldham.

**Skipton.**—Houses (36), Eastburn, for R. D.C.; T. Yeadon, surveyor, Council House.

**Spalding.**—"Airey" houses (32), Weston; F. Bernard Saunders, Council's architect, 10, The Crescent.

**Stafford.**—Workshops and service station, Wolverhampton Road; Doffman & Leach, 6, Market Square.

Omnibus station, South Walls; T. H. Higson, borough surveyor.

**Stretford.**—Flats (64), Brompton and Winchester Roads; borough engineer.

**Walkden.**—Offices for Ministry of National Insurance on Holly Avenue; J. Gerrard & Sons, Ltd., builders, Swinton, Manchester.

**Wokingham.**—Science laboratory and classroom at County Girls' School; county architect, 35, Bath Road, Reading.

**Woldingham.**—Houses (70), High Drive; W. F. Wright, "Tregeare," Upper Court Road.

**Wolverhampton.**—Traditional houses (178), Warstones Road estate; director of housing, Town Hall.

**Workington.**—Factory, Salterbeck Trading Estate, for Luxan, Ltd., 4, Chepstow Street, Manchester; Sir Alexander Gibb & Partners, consulting engineers, St. Anne's Lodge, London, S.W.1.

**Worksop.**—Factory, Harworth; Black Bros., Ltd., lace manufacturers, 53, Stoney Street, Nottingham.

## Trade Marks

THE following applications have been made for trade marks. Objections may be entered within a month from the dates stated:—

**17th December**

GLOBUS. No. 651,699, Class 9. Electric vacuum cleaners and parts thereof and fittings therefor, all included in Class 9. GLORIA. No. 651,700, Class 9. Electric vacuum cleaners and domestic polishing machines.—Van der Heem Naamloze Vennootschap, Maanweg 250-260, The Hague, Holland. Address for service: c/o Gee & Co., 51-52, Chancery Lane, London, W.C.2.

FREEWILL. No. 653,269, Class 9. Radio receiving sets (complete).—A. Freeman (Novelties), Ltd., 9, Dyers Buildings, Holborn, London, E.C.1.

POWER MASTER (design). No. B650,565, Class 11. Refrigerators and air conditioning installations.—Le Bryan & Co., Ltd., 314, High Road, London, N.17.

DELIA. No. B650,878, Class 11. All goods included in Class 11.—Decollete, Ltd., 72-74, Gipsy Hill, Upper Norwood, London, S.E.19.

DURAGLO. No. 653,598. Installations for lighting.—C. W. Clark, 24-25, Manchester Square, London, W.1.

**24th December**

COMMANDO. No. 641,486, Class 9. Signalling, telephonic and electric bell apparatus.—International Marine Radio Co., Ltd., Connaught House, 63, Aldwych, London, W.C.2.

FLOUVRE. No. 654,156, Class 11. Lighting installations, and lighting appliances included in Class 11.—Courtney, Pope (Electrical), Ltd., Amhurst Park Works, adjoining 341, Seven Sisters Road, Tottenham, London, N.15.

DOLE. No. 643,489, Class 11. Cold plates for use in refrigerators.—Dole Refrigerating Co., Chicago, U.S.A. Address for service: Stevens, Langner, Parry & Rollinson, 5-9, Quality Court, Chancery Lane, London, W.C.2.

HYMEGLAS. No. 653,642, Class 16. Insulating varnishes and insulating compounds.—Lewis Berger & Sons, Ltd., 35, Berkeley Square, London, W.1.